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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 17 JUNE, 1934 NUMBER 6

THE OCULAR FINDINGS IN A SERIES OF INTRACRANIAL FIBROBLASTOMATA

T. B. HOLLOWAY, M.D.
PHILADELPHIA

This is an analysis of the ophthalmic signs and symptoms of fifty-five verified cases of intracranial fibroblastomata. Group studies are submitted as these relate to the various affected portions of the brain. Read before the Section on Ophthalmology, New York Academy of Medicine, February 20, 1933. From the Department of Neurosurgery and Department of Opthalmology, School of Medicine, University of Pennsylvania.

The present comments concern a type of intracranial tumor that has been designated in the past by a number of different terms, but in recent years has been more commonly known as meningioma, or fibroblastoma; if you prefer, meningeal fibroblastoma, as suggested by Penfield.

These growths are frequently encountered in all neurosurgical centers and painstaking contributions to this subject have been made by Cushing, Holmes and Sargent, Elsberg, Frazier, and others. As to frequency, among intracranial tumors Cushing's and Elsberg's figures are essentially the same, namely, 13.4 and 13.2 percent.

It is not my intention to discuss the pathology of these tumors, in fact I am not qualified to do so, but some mention must be made of their points of origin. In 1922, Cushing dwelt especially on this phase and referred to the earlier observations and the later work of Schmidt, Weed, and Aoyagi and Kyuno. As the result of these studies the origin of these tumors was attributed to certain clusters of mesothelial or arachnoid cells that existed in relation to the arachnoid villi. Aoyagi and Kyuno described these cell clusters as situated about the crista galli, the superior sagittal and transverse sinuses, around the hypophysis, sella turcica, the plexus basilaris and practically all of the cranial nerves. Later, Penfield referred to the tumors as arising from the specialized connective-tissue cells of the arachnoid and since in certain instances there may be no demonstrable origin from the arachnoid, he preferred to speak of them as meningeal fibroblastomata. Concerning this, Elsberg has expressed the opinion that the origin of the cells from which these tumors arise must be sought before the final blastemic condensation of cells that are to form the several membranes of the brain. At that time certain cells usually resulting in arachnoid tissue may have become improperly aligned and have remained with those cells destined to become pia or dura.

These growths are usually more or less globular and encapsulated and vary somewhat in consistence and vascularity. At times they occur *en placque* or as multinodular growths. Occasionally they are multiple. They are of slow growth and tend to displace the cortex greatly, and while the sulci may be invaded, no actual infiltration of the brain occurs, although there may be a superficial atrophy of the convolutions as the result of prolonged compression. From what has been said about the origin of these growths, it may be surmised that both sides of the brain may be involved, not only at the base, but frequently by those growths arising from the falx, as many of them do. Such a growth may be present for a number of years before giving rise to frank symptoms or producing a rise in intracranial tension, and when the latter has developed it frequently is not so marked as the size of the growth would seem to warrant.

It is now well recognized that a thickening of the bone overlying or un-

derlying these growths frequently occurs, so that definite asymmetry of the skull may result. It is interesting to note that in this series one patient, observed in 1905, had a growth involving the lower anterior aspect of the temporal lobe with thickening of the adjacent bone. If the bone in this case had been examined microscopically the question of whether the hyperostosis were due to trauma and other factors or were dependent upon tumor invasion, as has been discussed by Spiller, Cushing, Penfield, Kolodny and Winkelman, might have been superfluous. However, at that time very little was known concerning these growths; it was but a few years after Mills had localized his first fibroblastoma and had seen its successful removal. But not only may inspection and palpation aid in the clinical study of these cases but the remaining member of the triad, namely auscultation, also may be of service. In certain cases a definite systolic bruit may be heard, either localized or general over the whole skull. Schreiber has recorded the history of four such cases but no one satisfactory explanation has been found.

The following comments concern 55 cases among 73 verified fibroblastomata observed on the neurosurgical service of Dr. Charles H. Frazier at the University Hospital. Of this group 21 involved the frontal lobe, 19 were temporal, 6 parietal, and 9 occipital. The cases were quite evenly divided as to sex; 25 were in males and 30 in females. As to age, the youngest patient was three years of age, the oldest sixty-five. The greatest number occurred in the fourth decade of life; between the ages of 21 and 30 years there were 9 cases; 19 between 31 to 40; 11 between 41 to 50; while between 51 to 60 years there were 9 cases. In other words 87.3 percent of the cases occurred between the ages of 21 and 60 years, inclusive. The average age for the whole group was 37.5 years.

Initial symptoms: Here, as so frequently happens in other intracranial growths, headache and impaired vision were conspicuous as the initial symptoms. In 14 instances headache developed first, impaired vision was first in 12 patients, while an approximate simultaneous onset occurred in 5 instances, a total of 31 or 56.4 percent. In other instances convulsions, motor or sensory disturbance, aphasia, visual hallucinations, and tinnitus or impaired hearing constituted the initial symptom; the most frequent of these was the first named. A number of these patients had been under observation for their eyes prior to admission and in one instance the refraction of the patient had been tested four times. Certainly no competent ophthalmologist in this day would test the refraction of a patient without making a fundus examination and if disc changes were found a field test would be made. But that is not sufficient; if headache and impaired vision should persist after a previous examination by a competent ophthalmologist, a field test would seem to be indicated, even in the presence of apparently healthy discs and maculae.

Ocular signs and symptoms: For one reason or another, such as blindness, the mental condition of the patient, and aphasia, it was impossible to obtain the vision in 20 instances. With 12 patients the vision was counting fingers or less, 10 had 6/12 or better, in 8 the vision ranged between 6/12 and 6/60, while in 5 the vision was better than 6/12 in one eye and less than 6/12 in the other (table 1).

Nothing of diagnostic value could be elicited from a study of the pupils. I have examined many hundreds of neurologic cases and have never succeeded in demonstrating a Wernicke sign by methods applicable to ordinary clinical work. Exophthalmos and nystagmus were noted in 8 cases. Concerning the former, 7 occurred in involvement of the frontal lobe and 1 in that of the parietal. Impairment of the ocular muscles or facial musculature occurred in 18 patients, most frequently affecting the latter, but not always the orbicularis. As to the discs, papilledema was noted in 38 cases, postpapillitic atrophy in 7, primary atrophy in 1, and in 9 no disc changes were observed. In certain of the cases grouped under papilledema, atrophy was clearly indi-

cated but a definite amount of swelling still remained. I have discussed elsewhere how variations in certain nervous tissues, bone, arteries, and veins might produce a definite influence on the onset or extent of the edema of the disc that occurs in intracranial growths, so this need not be referred to at this time. As with the vision, it was impossible to get the fields in certain instances, to be exact, in 17 cases, while in 7 patients the fields were practically normal. Concentric contraction was present in 12 cases, in 10 there was a right and in 3 a left homonymous hemianopsia, a quadrantanopsia in 2, while in 1 case there was a bitemporal defect in the red fields. One other patient had nothing more than enlargement of the blind spots, and another a misleading suggestion of a right-inferior-quadrant defect. Two preoperative fields in the remaining case were interesting because of the possibilities of different interpretations.

Frontal lobe fibroblastomas. It may be true that the diagnosis of a frontal-lobe tumor may not be difficult in the absence of adjacent lesions and after the development of certain typical signs and symptoms that are now well recognized, but the fact remains that they are not always seen under such favorable circumstances. In fibroblastoma, certain significant x-ray findings would be, of course, of additional service.

As frequently occurs, a definite percentage of these patients showed varying degrees of mental impairment, in the sense of lack of concentration, emotional outbreaks, silliness and whimsicality, and "tendency to melancholia." Convulsions, irritative symptoms or actual paralysis were also conspicuous and a definite percentage of the patients gave a history of trauma. Needless to say, in certain of these cases it was impossible to test the olfactory sense, but this was found impaired, on one side or both, in about 43 percent. Aphasia was present in certain instances and one patient had visual hallucinations, seeing "playing cards and radios passing in review" before him. Headache and impaired vision, either alone or in association, constituted the initial symptom or symptoms in 14 instances.

Table 1

FIFTY-FIVE CASES OF FIBROBLASTOMATA

Exoph.	Nystag.	6/12 or better	One eye better than 6/12; One eye worse	6/12 to 6/60	Fingers or less	Impossible
8	8	10	5	8	12	20

Papilledema	Postpap. atrophy	Prim. atrophy	No changes
38	7	1	9

Conc. contr. of fields	Rt. hom. hemian.	Lt. hom. hemian.	Miscell.	Normal	Impossible
12	10	3	6	7	17

Eyes: Among the 21 cases, exophthalmos in varying degrees was noted 7 times, and as is usually the case, where this was unequal or unilateral the prominent eye was homolateral to the lesion (table 2). In 3 cases nystagmus was present. Concerning the extraocular muscles, there was a questionable involvement of the lateral rectus in one case. Evidences of involvement of the facial musculature were observed in 8 instances, the lower part of the face was the more frequently affected. It was impossible to obtain the vision in 7 patients, while 7 others were blind

or the visual acuity was reduced to counting fingers. Three had 6/12 vision or better and in 4 patients it ranged between 6/12 and 6/60. As to the disc manifestations, no alterations were observed in 4 cases; 10 had papilledema and 6 a postpapillitic atrophy, giving an incidence of 78 percent for past or existing evidence of edema. One patient who had a large bilateral basal growth had a definite pallor of the temporal portion of each disc of so-called primary type.

Difficulty with subjective testing made it impossible to obtain fields in 8 of these cases, and in 3 others the fields were normal. The predominant field was a concentric contraction which was present in 8 instances. The fields of the remaining two patients have been grouped under "miscellaneous" and will be referred to later.

Comments: I have already stated that in many instances in frontal growths it is impossible to make any, not to speak of adequate visual tests, but where it can be done I do not believe one is apt to find, in the absence of a central scotoma, as much inequality between the two eyes as occurs in temporal-lobe tumors.

In this series where an inequality existed, whether marked, or whether it was a differentiation of such lower registers as blindness, light perception, hand movements, and counting of fingers, the greater impairment was homolateral to the lesion, or in the case of a bilateral tumor, on the side of the greater mass. One may readily conceive of conditions where this might not be true, but in the majority of cases I believe homolaterality prevails.

Concerning the discs, where papilledema occurred it was approximately equal in the two eyes in 5 cases, and where an inequality of 1 D. or more existed in the height of the swelling it was homolateral in 3 and contralateral in 2 cases. The one patient with an atrophy of the primary type had a large basal growth arising from the falx and extending about equally on the two sides. In the present series, a central scotoma was not elicited, but when such a sign is present it would be interesting to know its probable duration. Curiously enough, a well-defined ring scotoma was present as a bilateral manifestation in one case. In each eye the blind spot was included in the scotomatous area (fig. 1). The growth in this case was basal and extended on both sides, but more on the right, and probably arose from the olfactory groove. I have had considerable experience with brain tumors but this is the first time I can recall seeing a ring scotoma in a brain-tumor case, with or without choked discs.

Table 2

FRONTAL-LOBE FIBROBLASTOMAS

Exoph.	Nystag.	6/12 or better	One eye better than 6/12; One eye worse	6/12 to 6/60	Fingers or less	Impossible
7	3	3	0	4	7	7

Papilledema	Postpap. atrophy	Prim. atrophy	No changes
10	6	1	4

Conc. contr. of fields	Rt. hom. hemian.	Lt. hom. hemian.	Miscell.	Normal	Impossible
8	0	0	2	3	8

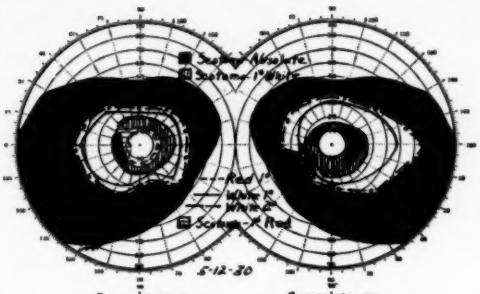
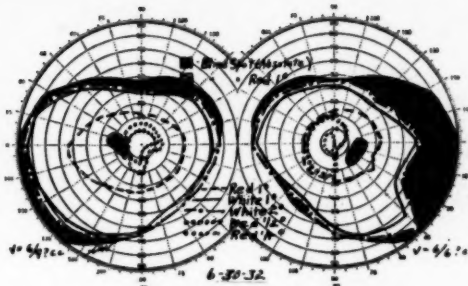


Fig. 1



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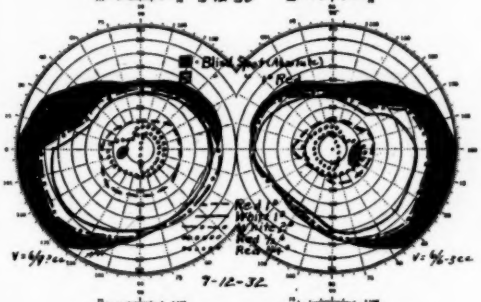

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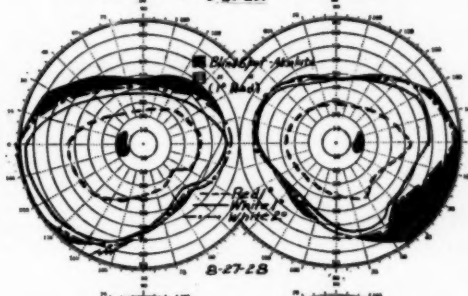

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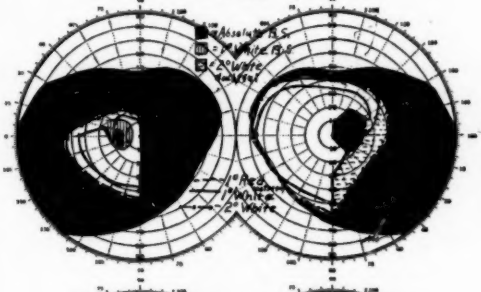

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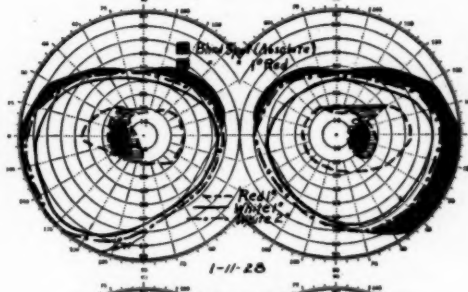

Fig. 9

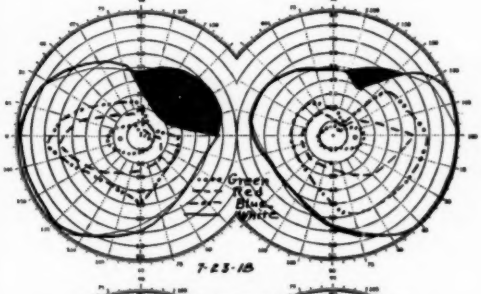

Fig. 10

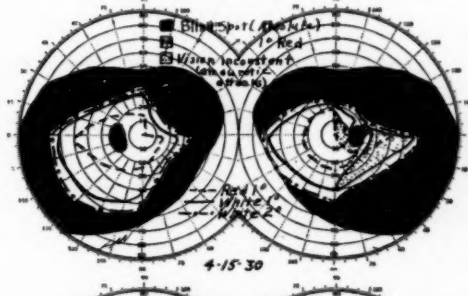

Fig. 11

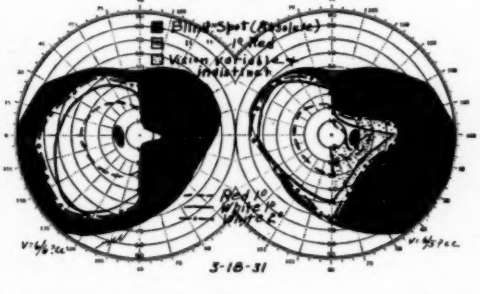

Fig. 12

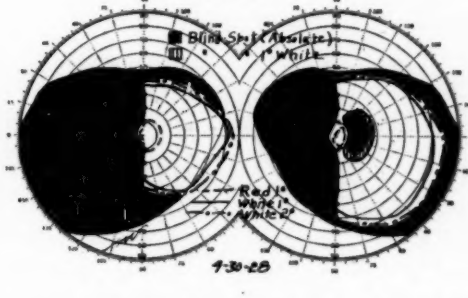

Fig. 13

Fig. 1 (Holloway). Ring scotoma in a case of anterior-fossa fibroblastoma.

Fig. 2 (Holloway). Suggestive of a beginning right homonymous hemianopsia.

Fig. 3 (Holloway). Same patient as described in figure 2, but twelve days later. Suggests early bitemporal defect.

Fig. 4 (Holloway). Suggestive of beginning right homonymous inferior-quadrant defect.

Fig. 8 (Holloway). Scotoma bisecting fixation in the right and field bisection in the left.

Fig. 9 (Holloway). Suggestive of early bitemporal hemianopsia.

Fig. 10 (Holloway). Superior-contralateral-quadrant defect.

Fig. 11 (Holloway). Contraction with right homonymous upper- and lower-quadrant defects. Also shows changes that occurred during an amaurotic attack.

Fig. 12 (Holloway). Incomplete hemianopsia with sparing of the macula.

Fig. 13 (Holloway). Contralateral hemianopsia with sparing of the macula.

In one patient of this group, the tumor occupied the floor of the right anterior fossa and extended posteriorly to include the anterior mesial half of the middle fossa. The right optic nerve and chiasm were compressed and pushed to the midline, the right optic tract displaced posteriorly. The first preoperative field tended to a right homonymous hemianopsia while twelve days later the field was more indicative of a bitemporal defect (figs. 2 and 3). Another patient with a growth of the *en placque* type over the convexity and about the tip of the right frontal lobe had a misleading field in the sense that it showed early indications of a lomacular bundle, and this doubtless was the opinion of Lillie at the time he wrote, and of possibly Kennedy, although he referred to retrobulbar neuritis. On the other hand, in 1927, Rønne stated he believed the scotoma the result of a true retrobulbar neuritis, which he thought was usually associated with placque formation in the nerve. In 1912* I expressed the opinion that this syndrome might result from constriction of the optic nerve by the overlying anterior cerebral artery and I still believe this is the chief pressure factor in a certain number of these cases. Curiously enough, the patient whose history was cited by Rønne, in

Table 3

PARIETAL-LOBE FIBROBLASTOMAS

Exoph.	Nystag.	6/12 or better	One eye better than 6/12; One eye worse	6/12 to 6/60	Fingers or less	Impossible
1	2	1	0	1	1	3

Papilledema	Postpap. atrophy	Prim. atrophy	No changes
3	1	0	2

Conc. contr. of fields	Rt. hom. hemian.	Lt. hom. hemian.	Miscell.	Normal	Impossible
1	1	0	1	2	1

right homonymous inferior-quadrant defect (fig. 4).

The importance of the Gowers-Paton-Kennedy syndrome in these cases of frontal-lobe tumors is now generally recognized. While this syndrome pertains particularly to frontal-lobe growths, it is nevertheless, from an anatomical standpoint, a middle-fossa sign. It was not observed in any case in the group now under discussion. I believe it is possible that simple pressure alone on the optic nerve may be sufficient to produce a central scotoma which may or may not be associated with a definite atrophy of the papil-

addition to a glioma of the right frontal lobe, had an aneurysm of the right anterior cerebral artery.

The relationship of retrobulbar neuritis to frontal tumors is not only an interesting one but at times a most confusing one. In fact, retrobulbar neuritis was the early diagnosis made in one of the cases in this group, while another patient with a positive Wassermann had been regarded as having an optic neuritis of syphilitic origin. It is not always possible lightly to pass by the thought of an ethmoidal or sphenoidal sinusitis, or in fact certain other causes of retrobulbar neuritis. One of these

* G. E. deSchweinitz and T. B. Holloway. A clinical communication on certain visual field defects in hypophysis disease, with special reference to scotomas. Section on Ophthalmology, Trans. Amer. Med. Assoc., 1912. Discussion.

that may be overlooked is Leber's disease; this I have recently discussed elsewhere, but it may be permissible to repeat that in all cases of optic atrophy and retrobulbar neuritis, consanguinity, heredity, and occupational pursuits should be inquired into, in addition to the usual inquiries noted on the average case history. While the results may not warrant the time and trouble, I am now having made a test of the olfactory sense in all cases of retrobulbar neuritis.

Parietal lobe. But one patient in this small group manifested headache or failing vision as an initial symptom, and in this case it was of occipital character.

Temporal lobe. In this group of nineteen cases headache, visual impairment or a combination of the two was the initial symptom in 57.9 percent of the cases. The occurrence of tinnitus and

Table 4

TEMPORAL-LOBE FIBROBLASTOMAS

Exoph.	Nystag.	6/12 or better	One eye better than 6/12; One eye worse	6/12 to 6/60	Fingers or less	Impossible
0	2	3	5	1	1	9

Papilledema	Postpap. atrophy	Prim. atrophy	No changes
17	0	0	2

Conc. contr. of fields	Rt. hom. hemian.	Lt. hom. hemian.	Quad.	Miscell.	Normal	Impossible
3	5	2	2	1	2	4

In another case hyperostosis was first observed. In the others convulsions and tingling and numbness in the extremities were first noted. In one case there was a moderate exophthalmos; nystagmus was noted in two instances. Paralysis of the globe muscles was not observed. Visual hallucinations were present in one instance. The vision of three patients could not be obtained. One patient's visual acuity was better than 6/12, another's between 6/12 and 6/60, and the remaining one was blind. Two of the patients had normal discs, three marked papilledema and in the remaining case a postpapillitic atrophy was present (table 3).

It was impossible to obtain the fields of one patient, and with two other patients they were normal. There was one case with a right homonymous defect, partial in the right eye with a scotomatous area around the blind spot that extended over to and bisected the fixation point, while in the other eye there was a complete hemianopsia with bisected fixation. In one instance there was a concentric contraction. The remaining field showed a scotomatous area for red extending above and below each enlarged blindspot.

deafness was not as frequent as one would be inclined to expect.

Exophthalmos was not noted, but nystagmus and visual hallucinations were present in two instances. Involvement of the third, fifth, and sixth nerves was also noted, usually in combinations. More frequently the facial musculature was affected, the upper portion of the face escaping in certain instances.

For reasons already cited it was impossible to obtain the vision in 9 cases (table 4). With three patients the visual acuity of the two eyes was the same; namely; hand movements, 6/8, and 6/6. In the remaining 7 cases, the vision of the two eyes varied one line or more on the eye card; the least dif-

ference was 4/7.5 and 4/9; the greatest, blindness and 6/9. In each instance the greater impairment was homolateral to the lesion, with one exception. In that case the impairment began homolateral to the growth and remained so for three months, but after that the vision in the contralateral eye was more affected.

Concerning the optic-nerve changes, 17 manifested papilledema, while the discs were normal in 2 cases. In those with edema, the swelling was equal in 12 cases and a difference of 1 D. or more was present in 4, in each instance homolateral to the tumor. While commenting on the tumors of the frontal lobe, I referred to the Gower-Paton-Kennedy syndrome as an anatomical sign pertinent to the middle fossa. Curiously enough while the sign was not observed among the frontal tumors it was present in one instance in this group. The vision was first affected in the left eye and the left disc was atrophic, especially the temporal portion, while a papilledema of 8 D. was present in the right eye. In this case there was a large fibroblastoma of the lower anterior aspect of the temporal lobe.

As to the fields, no perimetric examination could be made in 4 cases, the fields were normal in 2, and revealed practically nothing more than enlarged blind spots in 1 other case. Concentric contraction occurred in 3 instances, right homonymous hemianopsia in 5, and in 2 of these there was a suggestion of a greater involvement in the superior quadrant. Left homonymous defects were observed twice and in 2 instances typical early superior-quadrant cuts were present.

Occipital lobe. In this group of 9 cases, headache, impaired vision, or a combination of the two constituted the first symptom or symptoms in 5 cases. Other initial symptoms were convulsions, visual hallucinations, and aphasia.

Nystagmus was observed in one case, but exophthalmos and involvement of the extraocular muscles were not noted (table 5). As to the vision, this was obtainable in all cases but one. In 3 cases it was 6/12 or better, in 2 others it was recorded as between 6/12 and 6/60, and in the remaining 3 the vision was reduced to counting fingers, hand movements, or blindness. Equality of vision in the two eyes was the rule, for in but 2 cases was there a variation of one line, and I have included one patient who was blind in one eye and could count fingers with the other. In the other case the vision was 5/7.5 and 5/9?

As to the discs, all of the patients had a papilledema except one.

It was impossible to obtain fields in 4 cases. Of the remaining 5 cases, in 4 there was a right and in 1 a left homonymous defect.

Table 5

OCCIPITAL-LOBE FIBROBLASTOMAS

Exoph.	Nystag.	6/12 or better	One eye better than 6/12; One eye worse	6/12 to 6/60	Fingers or less	Impossible
0	1	3	0	2	3	1

Papilledema	Postpap. atrophy	Prim. atrophy	No changes
8	0	0	1

Conc. contr. of fields	Rt. hom. hemian.	Lt. hom. hemian.	Miscell.	Normal	Impossible
0	4	1	0	0	4

Comments. In a contribution of this type space does not permit a full discussion pertaining to the various theories and findings relative to the course of the retinal fibers and their projection on the cortical visual area. The investigations along these lines of Henschen, v. Monakow, Brouwer and Zeeman, Lenz, Archambault, Niessl-Mayendorf, Meyer, Rønne, Putnam, Holmes and Lister, Pfeifer, and others have done much to permit us to interpret more accurately the results of carefully and properly made perimetric examinations. But more instances of careful study of suitable lesions combined with adequate perimetric studies

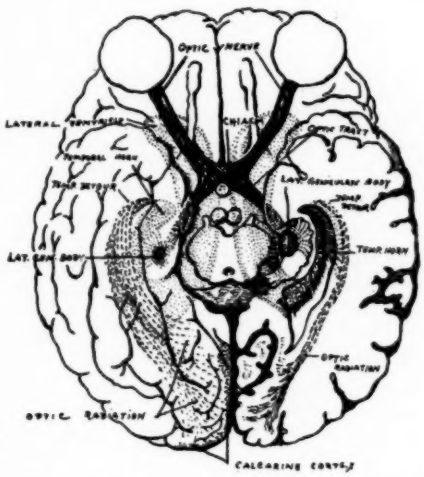

Fig. 5 (Meyer). Course of projection fibers around anterior horn. Inferior view.

as well as further experimental work will be necessary before thoroughly satisfactory conclusions may be drawn.

Briefly stated, from the work of Brouwer and Zeeman, Rønne, and Putnam, the upper quadrants of the retina are projected on the external geniculate bodies on the mesial and dorsal aspects, the lower quadrants laterally and somewhat ventrally. The macular fibers are posterior. From the external geniculate body these projection fibers course in the external sagittal stratum or the inferior longitudinal fasiculus, the upper quadrants above and the lower below. The upper and lower retinal halves maintain this same position when projected on the striate area and are probably anterior, the macular fibers occupying an extensive posterior position. The course of these fibers around the anterior horns of the lateral ventricles is well shown in the illustrations of Meyer (figs. 5, 6, and 7). The distribu-

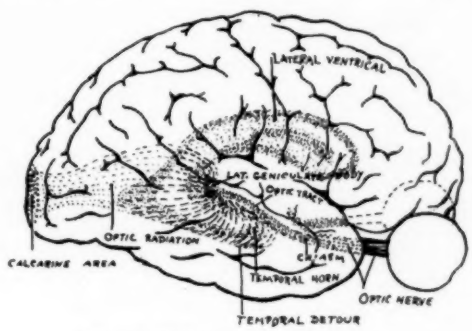

Fig. 6 (Meyer). Lateral view.

tion according to Pfeifer is depicted in the Kurzes Handbuch der Ophthalmologie.

Needless to say, operative cases of the tumor type provide lesions where the bulk of the destruction or compression may be apparent and lead to defects in the field that may be definitely localizing, when viewed in conjunction with the associated neurologic signs and symptoms. But, on the other hand, the most carefully made visual fields, like the results of other examinations, are

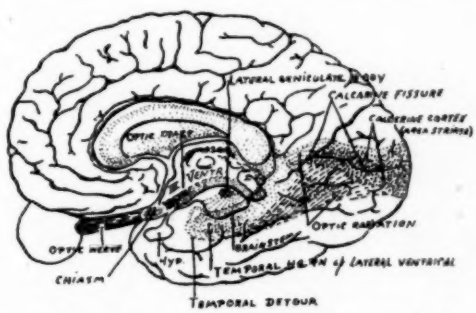

Fig. 7 (Meyer). From mesial surface.

not always classical, and may show certain defects that our present knowledge will not permit us to interpret with the facts obtained by operative procedures and even autopsy findings at our disposal.

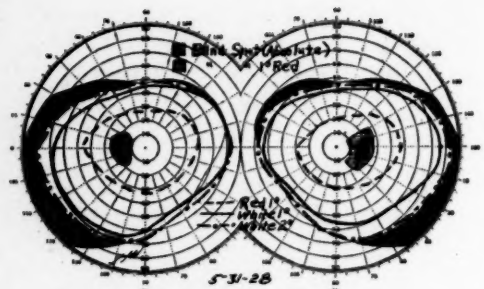

Fig. 14 (Holloway). Field of same patient four weeks after operation.

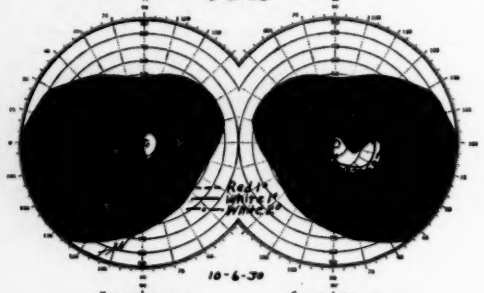

Fig. 15 (Holloway). Excessive contraction and hemianopsia with bisection.

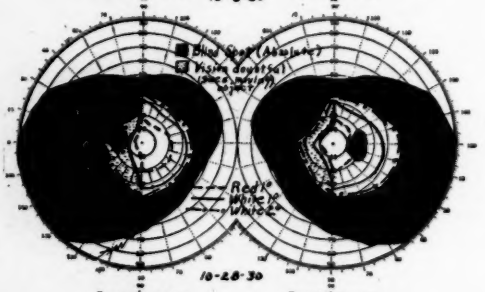

Fig. 16 (Holloway). Field of same patient three weeks after operation.

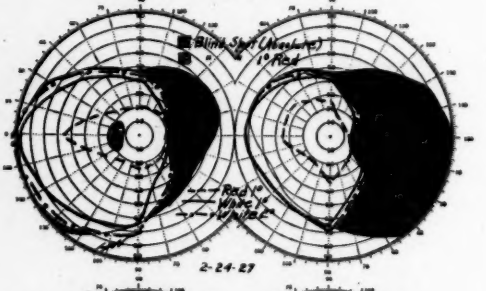

Fig. 17 (Holloway). Incomplete hemianopsia.

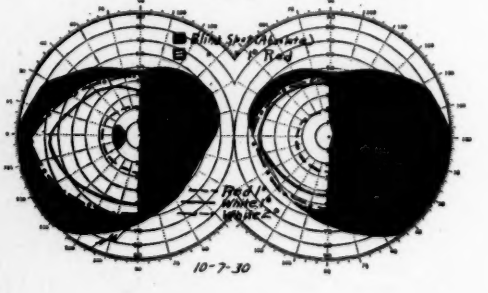

Fig. 18 (Holloway). Hemianopsia with sparing of the macula.

In the small parietal group there were two fields of interest. The first was a right contralateral hemianopsia with bisection of fixation in the left eye and a scotomatous area around the blind spot breaking through the 1° white field. In the right eye a scotomatous area included the blind spot and bisected the macula (fig. 8). The other field had a bitemporal scotomatous area adjacent to the blind spot breaking through the 1° red field. Such a field could readily be misleading, rather pointing to an early chiasmal lesion, such as is seen in pituitary cases (fig. 9).

The reader will recall that Cushing, in 1921, called attention to the superior-quadrant defect that may be present in temporal-lobe tumors due to involvement of the inferior longitudinal fasciculus, which doubtless represents the cortical-projection fibers emanating from the external geniculate bodies. In the present group of temporal-lobe tumors several types of fields were shown. The superior - contralateral - quadrant defect is represented in figure 10, more marked on the homolateral side. Another type showed an incomplete contralateral hemianopsia with a tendency to better preservation of the horizontal portions of the fields. However, it will be noted that even in these cases there was a greater tendency to superior-quadrant involvement (figs. 11 and 12). The patient whose fields are represented by figure 11 was subject to amaurotic attacks and one of these came on at the time of his perimetric examination. Dr. Wentworth had the thoughtfulness to make comparative tests. It was found that during such an attack the limits for all test objects shifted towards fixation. In the interval the macula was spared by about 7° with the 1° red, but during the attack it bisected fixation and the field for 1° and 2° white shifted towards fixation by 15° to 20°. The fields in these two cases would imply pressure upon both the superior and inferior portions of the fasciculus, but more marked on the latter. Naturally shifting of the fields occurs during amaurotic attacks and when these patients can be examined we have seen the field almost obliterated. For similar reasons I believe one should not be content with one preoperative field in atypical or doubtful cases, for variations in intracranial tension may mask or expose certain slight defects that might prove significant. Figure 13 represents a typical contralateral hemianopsia with sparing of the macula. To illustrate the satisfactory results that may be obtained in some of these fibroblastoma cases, a postoperative field, made four weeks after operation, is also shown (fig. 14). To illustrate a contralateral hemianopsia with excessive contraction of the remaining fields and bisection of the macula, figure 15 has been included; likewise a post-operative field made three weeks later (fig. 16).

Comparatively recent contributions concerning tumors of the occipital lobes by Frazier and Waggoner, Allen, and by Horrax and Putnam have again centered interest in this portion of the brain. Time and space do not permit full discussion, but as far as the fields are concerned the main points pertain to bisection or sparing of the macula, crescentic defects, used to describe peripheral partial hemianopsia, that involve both the upper and lower quadrants (monocular peripheral field), and finally quadrantic cuts in the fields. The incidence for the various defects in the forty cases studied by Allen and by Horrax and Putnam were as follows, the first figures relating to Allen: Complete hemianopsia with macular bisection 32.5 and 12.5 percent; with sparing of the macula 22.5 and 35. percent; fields showing crescentic defects 7.5 and 5. percent, and finally quadrantic cuts 12.5 and 12.5 percent. The above contributions concerned all types of tumors, and in the series, fields were not available in 20 and 25 percent of the cases.

In this small group of 9 fibroblastoma cases, fields were not available in four, so it is impossible to attempt comparative figures. In those fields available for study there was no instance of macular bisection and none of quadrant cuts. This latter type of field change was emphasized by Horrax and Put-

nam and occurred as a bilateral manifestation in 4 of their cases and unilaterally in one, but in each instance in the lower quadrant, which stands in marked contrast to the superior-quadrant defect more frequently seen in tumors of the temporal lobe. As to the other type fields, figure 17 represents an incomplete hemianopsic type and figure 18 the complete hemianopsia with sparing of the macula. This last field was that of a male, aged sixty-five years, who had been subject to headaches since early youth but up to the time of his examination at my office the first and only symptom probably referable to his actual lesion was a sensory aphasia which developed fourteen months before he came under observation.

Needless to say, all of the signs and symptoms above referred to, unless otherwise specified, were preoperative manifestations. This statement also applies to the fields and practically all of those shown were recorded on the Ferree-Rand perimeter by my associate, Dr. Wentworth.

It is not my intention to discuss in detail homolaterality, as this pertains to the amount of choking that may be present. Years ago this was thrashed over by Horsley, Paton, Cushing and Bordley, deSchweinitz and Holloway, and numerous others. My own opinion concerning this is that the question of homolaterality should not be confined to the amount of swelling. This may be the same in the two eyes, yet one disc may show signs of beginning atrophy, therefore the extent of apparent damage should also be considered. Vision, also, should be considered in respect to the first eye affected, the eye with the greater impairment, and the inequality of the vision existing. I believe that inequality will be shown in the greatest degree and probably in order of frequency in the middle-, frontal-, and posterior-fossa growths, respectively. As to the fields, concentric contraction is the most frequently noted in frontal growths, but where inequality exists, I believe the greater defect will be more frequently homolateral. Excluding chiasmal lesions, those growths of the

Table 6

COMPARATIVE DATA ON FIELDS IN TUMORS OF OCCIPITAL LOBE

	Allen Series Percentage calculated from 40 cases. Fields not available in 20 percent.	Horrax and Putnam Percentage calculated from 40 cases. Fields not available in 25 percent.	Horrax and Putnam Percentage calculated from 30 cases. Fields available
Group 1. Complete hemianopsia with bisection of macula	32.5	12.5	16.7
Group 2. Complete hemianopsia except sparing of macula	22.5	35.0	46.7
Group 3. Hemianopic crescentic defect	7.5	5.0	6.6
Group 4. Homonymous quadrantic defect	12.5	12.5	16.7
Group 5. Normal fields	5.0	5.0	6.6
Group 6. Indeterminate	0.0	5.0	6.7
Group 7. No fields available	20.0	25.0	0.0
Totals	100.0	100.0	100.0

middle fossa are apt to produce irregular or incongruous contralateral hemianopsia most frequently with macular sparing. This need not refute the idea of bisection in complete-tract lesions. In posterior-fossa or occipital-lobe growths I believe greater equality is shown in vision, extent of disc edema, and fields. The latter are most frequently congruous quadrantic defects or hemianopsias with or without sparing of the macula.

1819 Chestnut street.

PRACTICAL TRIAL LENSES AND A TRIAL SET

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DENVER, COLORADO

The advantages of relatively small plano-convex or plano-concave lenses are pointed out. Furthermore the virtue of simple, light trial frames is stressed.

When only spherical lenses were sold for spectacles, and these were ground and mounted in frames in the shop of the optician who sold them, the customer could look over the stock and choose those he preferred. There was then little need for anything like a trial set. But astigmatism was discovered and after its discovery was found in most eyes. It was found to vary in amount, and in the direction of its principal meridians. So there was need for trial frames and trial lenses which could be used for testing all kinds of eyes, before the necessary glasses could be prescribed.

The knowledge that optical defects of the eye cause important symptoms and disability to the person compelled to use such defective eyes, greatly increased the interest in optical errors. It made their detection, measurement, and correction a very important branch of the work of the medical profession. When physicians and surgeons had to study and prescribe for errors of refraction, trial sets were essential. Donders induced the opticians to supply the cylindrical lenses needed for testing astigmatism. But aside from that, doctors have taken whatever opticians have called a trial set and have recommended and supplied to them. When test lenses, frames, and allied apparatus became an important part of the optical business, the number and cost of lenses and frames grew to be an element in profits; and trial sets were elaborated in the direction of making them profitable to the optician.

The medical profession was slow to recognize that correction of refractive errors was a part of its duties to patients. Physicians did not eagerly take to the use of the tools by which this was to be done. They took the trial sets offered to them, without trying to make them as effective and convenient as possible; and with no thought of seeking to avoid unnecessary expense from their useless elaboration. Perhaps the greater size and more striking appearance of the larger trial case was thought to make it more impressive, and therefore more desirable.

Since cylinders have come to be used with spherical lenses, it has been necessary to have trial frames in which two or more lenses could be placed before each eye. Many, doing this kind of testing, have realized the defects of their apparatus, and have tried to devise something better, but in trying to get what they wanted, they have been drawn away from simplicity into undesirable elaboration. Keeping in mind certain mathematical requirements and mechanical principles, it is possible to simplify our trial sets greatly; reduce their bulk and cost, and add to their convenience and efficiency.

Admitting that we must have the means of trying lenses before the eyes in combinations of two and more, why should we not get the full benefit of the best lenses and simple frames for such combinations? Plano lenses are optically superior to the double convex and concave lenses in general use. As trial

lenses they are far better than the meniscus lenses that are being exploited at higher prices and by copyrighted names. Their superiority has been urged upon ophthalmologists since 1866; but not effectively enough to overcome the plausible claims and readiness of the manufacturers to supply goods from which they can get more profit. Those who are to use trial sets must give enough thought to the subject to find out what they want; and then insist on having it.

The customary lenses are 38 mm. in diameter. They are larger and heavier than are needed. But custom is hard to overcome. A lens 31 mm. in diameter, mounted in a flat rim, reduces by half the weight of the stronger lenses. It is large enough to handle easily and serves all purposes of testing vision. A set of such lenses is notably less bulky and more convenient.

There can be a great reduction in the number of such lenses required for a complete trial set, by using lenses in combination. Plano lenses so combined are practically accurate, and as light as when the two surfaces are ground on a single piece of glass. Such a combination avoids the inaccuracy of all combinations of double convex and concave lenses.

The possibilities of such a set of small lenses are best understood by considering what can be done with 12 pairs of spherical and 8 pairs of cylindrical lenses. These include 0.25, 0.50, 0.75, 1, 2, 3, 4, 5, 10, 15, 20, and 25 D. for the sphericals; and the same up to, and including 5 D. for the cylindricals. By combining two of these we have any spherical, with 0.25-D. intervals, to 6 D.; and by 1-D. intervals, a series to 30 D. For the cylinders there are 0.25-D. intervals to 6-D., and 1-D. intervals to 9-D. This is a more extended series than is commonly furnished by the larger sets of trial lenses that are not adapted like the plano lenses to combination. The two-cell trial frame, each cell taking two plano lenses, makes easy the placing of any strengths of the spherical and cylindrical series together, before an eye, with as much accuracy of strength as is obtainable with the usual trial sets.

The intervals of 0.12 D. are eliminated because they are not useful in any trial set. If an eye requires for its correction a +1.12 sph., this fact can be established more quickly and more certainly by comparing the effects of a 1- and a 1.25-D. lens, than by any use of a 1.12 sph. With cylindrical lenses intervals of one-eighth D. are still less useful and more confusing.

This practical trial set must include three cross cylinders, the +0.25 —0.25; the +0.50 —0.50; and the +1. —1. These will be used more than any other lenses in any trial set by one who understands the importance of astigmatism, and the method of using the cross cylinder to determine its meridians (the direction of cylinder axes) and their strengths.

The lenses furnished are only one of each strength. The pairs referred to, are one convex and one concave of equal strength. By the possible combinations this allows of placing lenses of equal strength before the two eyes. Suppose each eye has hyperopia 4.75 D. Before one eye is placed a +4. with a +0.75 D.; and before the other eye +5. with —0.25 D. This will be found true for all, except for the highest and rarest errors. We could not provide for a pair of myopic eyes, if each required —30 sph. with —9. cyl. But there is no reason to suppose that such a pair of eyes ever existed. Even after bilateral cataract extraction, the two eyes never require exactly the same combinations.

Trial frames adapted for the purpose are essential for the use of such lenses in clinical testing. The best thus far found are the simple steel wire frames of proper size, carefully adjusted. The spring of the wire must hold the cylinders at the axes selected. The width between centers may be 61 or 62 mm. The temples should be straight, holding to the sides of the head, in any position to give the lenses the proper angle. A protractor is needed to determine the direction that has been selected for the axis of the correcting cylinder. Such a protractor is larger and more accurate than the graduated scales on many trial frames. The wire hooks should hold the lenses securely by their mountings,

without catching the edge of the glass, when this is thick, as in concaves and near the axis of a strong convex cylinder. These hooks should be so placed on the eye wire that they hold a little more than half the circumference of the lenses. For convenient use they must be kept in shape or adjusted when they get out of shape. Placing the temporal hooks lower than the nasal, facilitates introducing, or removing lenses, when the frame is on the face. Habitual use of such frames has convinced the writer, and others who have tried them, that frames of this kind are to be preferred to any of the heavier, more elaborate and more expensive frames that do various things that are commonly not worth doing.

The diagnosis of ametropia with trial lenses is best made by frequent changes and comparison of lenses held before the trial frames and the lenses that are placed in them. Such supplementary lenses better serve the purpose than changes of the lens in the trial frames. The instantaneous change of the lenses before the eye is the best form of subjective testing, and is impossible when each lens has to be removed and another substituted in the trial frame. The instant reversal of effect, possible with supplementary lenses, gives a more rapid and reliable method of subjective testing than any other. It also compels close attention to the testing, and builds up the examiner's conception of what is going on in the eye tested. It secures speed, accuracy, and alertness on the part of both patient and examiner.

Such a trial set can be easily carried anywhere that it may be desired to determine a patient's vision. The real capacity for vision can be known only when errors of ocular refraction have been corrected or compensated. This is true for the ophthalmologist or any physician who wishes an exact record of the visual acuity. It is also convenient to have such a set in the dark room of the completely equipped office, where refraction is to be measured by skiascopy. When it is desirable to let a patient keep his correcting lenses before his eyes, before prescribing them, such a set will furnish the lenses needed for any case. They are also needed where several workers in a clinic are engaged in correcting refraction.

The ready use of such a trial set with economy of time, may require a developed understanding of lenses and lens combinations. This may not always be needed by the optometrist or the technician who is primarily trying to sell a pair of glasses that will not at once demonstrate their unfitness for the eyes of the customer. But such an understanding is essential to the eye physician; and there is no better way to acquire it than by actual work with such a trial set of plano lenses, and the simple trial frame and protractor.

A real understanding of refraction and a knowledge of anatomy and of the general symptoms, causes, and results of disease are the true foundation for the claim that a physician, rather than a lens salesman should be entrusted with the care of the eyes.

A school trial set

The extension of public education, and the increase of occupations depending on constant guidance by accurate vision, have made it essential that the majority of children and adults shall have accurate measurement and correction of optical defects. This situation demands that the instruments of optical diagnosis shall be made as efficient as possible, and cheaply enough so as to bring them within the reach of physicians who may spend but a small part of their time in correcting errors of refraction. The time has come when every school child should be relieved of the handicap of poor vision, or of seeing clearly at the cost of nerve strain, which must impair health and lower future productive capacity.

If the school children in isolated country districts are to have the benefits of real health examinations, every such district must have the service of a set of trial lenses, adequate to test all sorts of eyes with convenient speed and accuracy. This practical need has developed from our school system and from the new ideals of health that make it important to consider what can be done to make the trial set more efficient,

more generally accessible, at the minimum of necessary cost.

The Joint Committee of the American Medical Association and the National Education Association upon Health Problems in Education, has made a sharp discrimination between health inspection of pupils, that may be made by teachers, principals, school nurses, and other laymen, and the health examinations to be made by physicians who have a medical education. The former can point out which children need the health examination; but only the health officer, or school physician, can decide what should be done for each child to prevent disease or maintain health. The use of a set of trial lenses in the testing of vision would fall to the duty of the school physician. The need for glasses or treatment of the eyes is a medical question to be decided by the physician.

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MALINGERING TESTS

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This discussion was presented before a class for instruction at a meeting of the American Academy of Ophthalmology and Otolaryngology in Boston, September 19-22, 1933.

It would appear to be an almost universal human failing that most people should, honestly or dishonestly, attempt to explain many functional disturbances in limbs or organs on a basis of injury. With the possible exception of the spine, the visual apparatus probably offers the malingerer his best opportunity.

Several terms in common use, in discussing malingering, should be clearly defined. By Simulation we mean the feigning of an ocular injury or disease which does not at all exist; by False Attribution is meant the ascribing of an untrue cause to an existent injury or disease; by Exaggeration, the claim that a certain injury or disease is of greater severity or more disabling than is actually the case.

Brief mention should be made here of Dissimulation, or the pretense that an actual disease or disability does not exist. This attitude is mostly encountered in workmen when they attempt to secure employment. It is apparently an inevitable outgrowth of Workmen's Compensation Laws both in Europe and the United States.

The psychology of the malingerer is important, and a few of his characteristics, if known and observed, will be a great aid in detecting his deceit. It is surprising to note how many people find it justifiable to magnify the extent of their ocular injuries. They think that either their employer, or his insurance company, could pay any exorbitant claim, disregarding its honesty.

Another common trait of malingerers is their conceit. Regardless of whether they have been previously coached or not, nearly all malingerers attempt to give you the impression that their answers to your tests are unusually prompt and intelligent. This is quite to be expected, as we know that the average working man is not as smart as he thinks he is. It is really a great help to diagnosis, however, if your patient will fool himself rather than if you must do it all.

Do not, however, fail to recognize the malingerer of high intelligence. A classic example of such a case was that of a physician, examined in our office some years ago. This type of patient will probably make one grave mistake; he will attempt to act very unintelligent while at the same time he will perhaps volunteer the flattering news that you have a great reputation, a splendidly equipped office and a most thorough and comprehensive method of examination.

In the general routine of examination, special emphasis should be placed on a few procedures. I consider it very

important that everyone be excluded from the examining room except the patient and physician. It may at times be necessary to have an interpreter, but there is no good reason why the patient's lawyer, physician, or relatives should be present, and there are many good reasons why they should not be present.

In the handling of all injury cases, whether malingering is suspected or not, it is necessary to secure a full and careful history. It is also preferable to secure the history before any examination is made. The more recent the injury, the more likelihood that the history is fairly accurate and honest.

When at all possible, test the visual acuity for both distance and near. If the patient be under treatment for some time, repeat these tests at frequent intervals and be sure to record the results before discharging him.

Do not only make a careful and complete examination of the eye and surrounding tissues, but record a complete and concise description of your findings. Read your record over before filing and correct any contradictory or ambiguous statements you may have written.

Certain routine tests for fields of vision and motor function should be made if there is any question that these essentials may have been involved through the injury.

Lastly, have no hesitancy in ordering an x-ray examination when there is any suspicion of penetrating foreign body or injury to the bony structures of the orbit. Whoever employs you to examine a patient must expect to pay for such special examinations if you deem them needful in the slightest degree.

Before going into the discussion of malingering tests, a few words should be said about differential diagnosis. Most important are those cases which can be classed under the head of hysteria or of traumatic neurosis.

The functional disturbances of the eye in hysteria are many and varied; they are also usually multiple. There is some difference of opinion among writers, but the majority seem to agree that hysterical manifestations occur both as a unilateral and a bilateral affection, the former being much more frequent. It is, however, possible to have an extreme functional disturbance in one eye and a much milder form in the fellow eye.

The so-called anesthesia of the visual sense, found in hysteria, varies in degree from a low-grade amblyopia to a complete amaurosis. Usually the pupils react well to light; occasionally there is miosis and an associated spasm of accommodation with myopia; mydriasis and complete loss of pupillary reaction is denied by some authorities but undoubtedly has been seen, one such case occurring in the writer's practice.

Diplopia is a common complaint, often monocular; polyopia has been noted. Ptosis of spastic type, blepharospasm, hyperesthesia of the retina, hemianesthesia and corneal anesthesia, and conjugate deviation of the eyes all occur with frequency.

Disturbances in the visual fields are interesting and common. As our knowledge of field changes increases, however, we realize that too much emphasis must not be placed on field changes unless accompanied by other stigmata of hysteria.

Concentric contraction of the visual fields for both white and colors is very common; if a tubular field is found, such is usually considered pathognomonic; inversion of the color fields may be present, the blue field becoming smaller than the red, but similar color-field changes have also been found in brain tumor, tabes dorsalis, and poisoning with lead or nitrobenzol. Central and paracentral scotomata have been reported, but hemianopsia does not occur. Lastly, but of great importance, the findings on ophthalmoscopic examination are entirely negative.

Malingerers who do not claim loss of visual acuity, but base their claims upon other symptoms alone, are uncommon. Persistent asthenopia, exhaustion of vision or kopiopia, visual-field disturbances, strabismus, and disfiguring scars from previous injuries have all been reported. The majority of these cases come under the head of false attribution.

Most important of these because most difficult to disprove, are injuries and wounds to the eyebrow, lids, and conjunctiva. One may be called upon to render his opinion as to whether the condition found on examination could have been produced by the injury as described by the patient. It is obvious that answers to such questions are often extremely difficult to make.

Sometimes one is confronted with a patient who gives a vague history of some sort of injury, and the chief complaint is a red and irritable eye. If the eye does not clear up under ordinary local treatment, and the redness and hyperaemia are situated mostly at the external or internal canthus, it is well to remember that it may be a self-inflicted injury. Such patients should be placed in a hospital, the eye sealed tightly, and constantly watched day and night. At the end of twenty-four and forty-eight hours examinations will show the eye to be clear and normal. The presence of a self-inflicted injury is definitely proved.

Patients who claim partial or complete loss of vision in both eyes have to be treated somewhat differently from those who claim loss in only one eye. Simulated partial amaurosis in both eyes is perhaps the most difficult of all types of malingering to detect. The usual tests employed for one eye only should be tried, to be supplemented as follows:

First: Repeated tests on different days, made with test cards ending in lines of different-sized type, will now and then suffice, the malingerer believing that on each occasion, he should, to be consistent, leave off reading at exactly the same number of lines from the bottom.

Second: It is also always suspicious when the patient, reading aloud from the test card, claims he can see no farther although he has so far made not a single mistake. An honest reader will nearly always miscall certain hard letters in one line but will read several easy letters in the line below.

Third: Those rare instances of falsely claimed total blindness in both eyes are extremely interesting. One should look for the staring expression, the "listening" attitude, the slightly upturned face and the short stepping of the truly blind. Then ask the patient to look at his own hand; the really blind will unhestatingly fix his own hand, the malingerer will probably look purposefully elsewhere. This test may also be modified by holding the patient's hand up before him with the thumb and little finger flexed, then ask how many fingers he has up. The blind, of course, will reply promptly. The malingerer may answer falsely, thereby exposing himself.

Do not forget to make a careful study of the pupillary reactions, bearing in mind the possible presence of posterior synechiae; there is a rare possibility that atropine or cocaine has been instilled—but even then light thrown into the supposedly blind eye will produce a consensual reaction in the other eye; and lastly, cases of cortical blindness, in which pupillary reactions may be normal, must be borne in mind.

Even a little detective work may be necessary in some of these cases of fraudulent claims of partial or total loss of vision in both eyes. Investigation may prove that the subject is doing close work at home, and often some acquaintance may be found, who will testify that the patient reads his morning paper or drives his own car. It may be possible to keep the patient sitting in the waiting room for several hours until he gets restless and starts to peruse a magazine. The secretary can be on the lookout for just such an action.

Those who claim partial or complete loss of vision in one eye, make up by far the largest percentage of all malingerers seen by the oculist. In examing this class of patient we have, however, one great aid—the uninjured eye. The uninjured eye should always be tested first and any error of refraction corrected. If we are fortunate enough to find the uninjured eye normal, most of our troubles are already over.

Even a hurried search through the literature will disclose the fact that there are about as many tests for simulation of blindness as there are operations for disturbances of the external

ocular muscles. We must limit our discussion to those that have proved their value in the hands of many men, and omit either naming or discussing procedures that have long since been discarded.

Tests for malingering, based on the manipulation of lenses from the trial case, are of great value. Before proceeding to use such tests, the patient's refraction, especially in the sound eye, should be determined. This having been done, we may first try the method of Arlt.

Arlt's test, slightly modified in different ways by Michel, Vossius, and Dujardin, consists of testing the supposedly bad eye with weak lenses. If the simulator pretends that his sight is much improved or considerably decreased when a plano or +.25 D. sphere is placed before the eye, he is, of course, malingering.

In all of these tests great care must be taken to watch for the quick, fugitive closure of the "bad" eye, done to ascertain what each eye is seeing.

Harlan's test is more valuable. In this a very weak lens (—.25 D. sphere) is placed before the bad eye and a high convex sphere before the good eye. If the patient will read the test letters, he is, of course, reading with the supposedly bad eye. I have modified this test somewhat and proceed as follows: A strong convex lens is placed in the trial frame before both eyes, completely fogging the reading chart. The strength of the lenses is gradually reduced until the patient is just able to read the top letter on the chart. Between each change of lenses, and these should be made rapidly, one hand is held before the trial frame, so the patient cannot see with either eye. When the patient has read the top letter, we proceed further to reduce the strength of the lens before the poor eye by adding minus spheres, but before the sound eye we merely add a plano or .+25 sphere. If the patient continues to read, he must be doing so with his bad eye. We can return to this test later in the examination and check our findings by covering the bad eye and fogging the good eye alone.

A favorite among all malingering tests is that of Snellen, which depends upon the fact that while similarly colored rays can pass through a colored glass, rays of a complementary color are stopped. Red and green letters are painted on a piece of glass with an opaque and black background, the letters being illuminated by a light behind the glass. Then place a red glass before the seeing eye and a green glass before the supposedly blind eye. If the patient reads any of the green letters, he is, of course, reading with the eye claimed to be blind. It is important that the Snellen letters shall have been painted on the glass by a commercial artist who used a red and green lens in front of his own eye until he found a complete fade-out. If the letters are varied in size, this test will also check the patient's visual acuity.

A modification of the above test is to have red and black letters on a white background. Place over the seeing eye a red glass. If the patient reads both red and black letters, he is seeing with both eyes. This test is highly recommended by Alger, who uses a special reading card to be held at 33 cm.

Several tests have been employed using a Snellen chart at 5 or 6 meters and cylindrical lenses. Segal placed a 1 D. convex cylinder before each eye, the axis of one at right angles to that of the other. If reading is as easy with these as without glasses, the patient is probably malingering. Kugel modified this test by having the patient look at a spot of light; if he admits seeing a cross he must be seeing with both eyes.

Jackson's test with a crossed cylinder is better. A +1.00 D. convex cylinder and a —1.00 D. concave cylinder are placed in the trial frame before the good eye, with both axes horizontal. The patient is then asked to read the test chart, and while he does so, the convex cylinder is turned to axis 90. With the axes now at right angles the crossed cylinder is slowly rotated. If the patient continues to read, he must be doing so with his supposedly blind eye.

Although not dependent on the use of lenses, the test of Fitow might be noted at this time. This is performed

by showing Snellen test letters to the patient, one letter at a time, characters of smaller dimensions than those that correspond to the distance from the patient being shown in each instance. The distance from the chart is then diminished but always to a relatively less degree than the size of the types the patient is asked to read. This is basically a good test, but difficult to manipulate.

Various tests with prisms are in common use. Priestley Smith placed a 6° prism, base out, before the supposedly blind eye while the patient was reading. If the eye moved in to fix, it was, of course, evidence of binocular vision. Graefe's test was to place a 12° prism, base up, before the sound eye; then to have the patient read printed letters placed on a white card. This produces a double line of letters, and most malingerers will read both upper and lower lines.

By far the best prism test, however, is to have the patient look at a spot of light. The bad eye is then covered and diplopia produced in the good eye by means of a prism, which bisects the pupil. For this test the modified prism of Schild is especially useful. This consists of an 8° square prism, the base of which is fused to a piece of plano glass of the same size and thickness. The patient having now been convinced that he can see double with his sound eye, the cover over the bad eye is stealthily removed and at the same time the prism before the sound eye is moved so as to cover all of the pupil. If diplopia still persists, one image, of course, must be that of the supposedly blind eye. Baudry has modified the above test by placing a red glass before the source of light, claiming that the red glass produces two images so alike that the false cannot be told from the true.

Baudon produced diplopia by using two prisms of 15° each, one red and one blue. As the images are poor in color, the test must be done in a dark room, and is therefore of doubtful value.

Two tests using light alone should be described. That of Delay and Herter is to flash a light quickly and suddenly into first one eye and then the other with a small mirror, the patient being unable to recognize into which eye the light rays are directed. This test requires rapid cooperation on the part of the patient, and an intelligent malingerer may outguess the examiner if he can even faintly see the hand that manipulates the mirror.

Much more valuable and frequently workable is to have the patient follow a candle, both eyes open, and tell you, as you move the candle in the various fields, when he can no longer see the light. If he still sees the candle when it is really hidden from the sound eye by the bridge of the nose, he is malingering. One subject in my own experience insisted that he could see two candles when the light was held directly in front of him, and continued to see two when the candle was quite out of the field of the sound eye, but when tested again a few minutes later, for each eye separately, he saw only one candle with either eye.

Malingering tests at the ordinary reading distance fall into two general categories, those performed by means of lenses or prisms and those requiring certain mechanical and optical contrivances.

When a person has one normal eye and is not presbyopic, place a +3.00-diopter lens before his good eye and have him read the near card at 8 inches with both eyes open; a plano glass can be placed before the other eye. After reading out loud, a pretense is made of fixing the frame and you ask him to read again, but the book is then held at 12 inches. If he reads at that distance, it is with the supposedly injured eye, as his near point with a +3.00 lens is inside that distance.

Jackson uses a +4.00-diopter sphere before the supposedly blind eye and a +2.00-diopter sphere before the sound eye. Dujardin uses a + or —2.00-diopter lens before the sound eye, while Harlan uses a +16.00-diopter sphere. Nettleship carried this idea further by instilling atropine in the sound eye. He then bandaged both eyes for one hour, and followed this by having the patient read small type. This, in my mind, is not a good procedure, for even should

the patient not object, the oculist lays himself open to the criticism by the patient of having given improper treatment to his sound eye.

Tests based on the principle of bar reading have been used for years.

Cuignet's method is to direct the patient to read with head and reading matter held absolutely still. Insert a pencil vertically between the eyes and the book. If he reads uninterruptedly, he is seeing with both eyes. Instead of a pencil, Driver uses a ruler, 4 centimeters broad; Javal used dots, figures, and printed words, instead of ordinary reading matter. The test, however, is by no means infallible, as a malingerer who has been coached will refuse to read portions of the words. Also, if the patient moves his head, the test might discriminate against one who is really blind.

Of much more value is the test of Judson Harmon, as modified by Mason. The simple apparatus consists of a board, 14 inches long, provided with a handle, and with two cross-boards placed at right angles to its length, one fixed at 7 inches from the end of the board and the second at the end of the apparatus. The center board has a round opening about the size of a silver dollar, and the near-vision test cards are supported against the end board. The patient is asked to hold the instrument firmly against his chin, looking forward through the hole to read the letters on the near-vision test cards with both eyes open. As some of the letters and words will be obscured when one or the other eye is not seeing, it is easy to detect the actual near vision the patient may have. We may also insert a wooden peg just in front of the test card and request him to read further. This makes a simple but satisfactory bar-reading test.

Belan's test consisted of showing test letters to the suspected malingerer of a size so small and at such a distance that the patient cannot read them. The types are then held nearer to the patient, who, if innocent, should read them at the distance corresponding to his known vision. An improvement upon this test will be described later when we discuss the stereoscope.

The prism test, as described previously, may be tried, placing a 10° prism, base out, before the supposedly blind eye, while the patient is reading, and watching the eye move in to fix.

Just two years ago Falta described what he called the approximating test. This rests on a physiological effect, the convergence of the eyes. The examiner has to ascertain whether the medial recti muscles of both eyes turn normally inward or not. At the level of the nasal root and at 15 cm. distance, the patient fixes the finger tip held 1 cm. from the median line toward the side of the eye to be examined. If this eye deviates toward the temple, it is an absolute sign it is blind or amblyopic. If there is no deviation, the test is negative and indicates that the eye cannot be blind or amblyopic. Note, however, that the test would also be negative in paralysis of accommodation, so this must be ruled out.

Many tests have been used and described which depend on the reflection of images from inclined mirrors. Most of these are of boxlike construction and are open to the criticism of all box tests, that the patient's eyes cannot be observed. One of the earliest and best of such tests was that of Fles. A rectangular box holds two mirrors of a definite size, placed vertically with an inclination of 120°. The small dimensions of the apparatus cause prolonged efforts of accommodation before the images are found, and the images are placed so close together that it produces a lack of precision in the answers of the patient.

This test has been modified in numerous ways and the literature lists at least a dozen tests under as many men's names, but all based on the same principle. Probably the best-known modification is the optoscope of Bertin-Sans, but this has also long since been discarded by most examiners.

A very simple, rapid, and exact test is the one devised by Dr. Percy Fridenberg. This consists of a modified trial frame with an arm extending from each side, from which hangs a test card. The bridge of the frame is extended forward

to an arm which the patient holds to keep the frame in place. This arm is then prolonged farther and united to it is a horizontal arm which carries a small mirror. The mirror can be rotated laterally through an arc of 180 degrees. When the pointer on the mirror is at 90 degrees, the plane of the mirror is at right angles to the line of vision of the eye on the corresponding side, and this eye sees its own image. The test card on this side, however, is not normal to the mirror, and its reflection is seen only by the opposite eye, which the subject presumes to be unconcerned in the visual act.

We have made mention of numerous procedures, tests, and instruments which have been or are being used in testing for simulated blindness. One test, however, I have left until the last because in my own experience it has proved the most valuable of all. The earliest use of the stereoscope in this type of examination is usually credited to either Hogg or Lawrence. The instrument itself is, of course, familiar to all. It is necessary merely to emphasize several points about its use. First, the hood about the eyepiece should be removed; second, do not use intricate cards which require fusion or stereopsis, as it is necessary only to prove the presence of simultaneous vision. In my own experiences I have found the cards which I myself made superior to those sold by instrument makers.

In conclusion, I would emphasize the following points:

(a) Use those tests which are simplest and easiest for you, but be thoroughly familiar yourself with every procedure you employ.

(b) Work rapidly and uninterruptedly, but repeat any tests as often as you like at various stages of the examination.

(c) Dominate the patient. Confuse him if you like, but insist that his answers be prompt and concise, and eliminate irrelevant statements on his part and unnecessary conversation on your own part.

The author is grateful to Dr. Roy Mason of St. Louis, for his kind assistance in the preparation of this paper.

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INTRACAPSULAR VERSUS EXTRACAPSULAR EXTRACTION OF CATARACT

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The results in two hundred cataract extractions, divided evenly between the extra- and intracapsular methods, are listed in tabular form. The author finds the results favor the intracapsular method, which in the hands of a skillful operator he considers to be as safe as the older capsulotomy method. Read before the Section on Ophthalmology at the 84th annual session of the American Medical Association in Milwaukee, June 15, 1933.

Following is a comparison of the results of 200 consecutive extractions of cataract that I have performed within the past three years, one half intracapsular and one half extracapsular. No congenital, juvenile, or traumatic cataracts are included in this series, although, as will be seen later, there were other types than the simple senile. The statistics are presented merely to record one man's experience with two different forms of operation on the same class of patients, under unchanging hospital conditions and with the same set of assistants.

In general, both operations are identical up to a certain point, and hence one description will suffice, as follows: general preparation of the patient; lavage of the tear sac; previous cleansing of the conjunctival sac with a 1:5,000 dilution of oxycyanide of mercury solution; mild hypnosis two hours before operation; O'Brien or Van Lint akinesis if deemed necessary, but not as a routine measure; instillation of cocaine and epinephrine anesthesia; retrobulbar anesthesia through the upper transitional fold; external canthotomy when necessary; bridle suture under the superior-rectus muscle; fixation of the eyeball with Elschnig or O'Brien-Elschnig forceps; retraction of the lids with Fisher hooks (no speculum was ever used); two-fifths Graefe incision at the limbus with a large conjunctival flap; single or double silk suture of the flap, loosely tied and laid aside; incision of the root of the iris; peripheral iridectomy or complete iridectomy as considered advisable.

In extracapsular extraction, the operation then proceeded with the following steps: capsulotomy either with a cystitome or with capsule forceps; delivery of the lens by pressure at the lower limbus with a large hook, and counter-pressure on the scleral lip of the incision with a Fisher flat spoon; lavage of the anterior chamber with sterile physiologic solution of sodium chloride when the cortex remained visible; removal of chunks of the cortex or pieces of the capsule with a Jaeger spoon when necessary; suture of the conjunctival flap tied; subconjunctival reposition of the iris; instillation of atropine in the case of complete iridectomy or of physostigmine (eserine) in the case of peripheral iridectomy or incision of the root of the iris; removal of the bridle suture; closure of both eyes.

In intracapsular extraction, the operation deviated from the foregoing procedure in the following steps: The capsule near the lower pole of the lens was grasped with the Elschnig-Stanculeanu forceps and the lens rocked from side to side for about ten seconds, or until dislocation of the lens could be seen or felt. Pressure was then applied with the blunt hook at the lower limbus in a backward and then a backward-upward direction, at the same time making gentle traction on the capsule with the forceps (about 80 per cent push with the hook and 20 per cent pull with the forceps. As the lens presents in the wound, the pull was lessened and the final delivery effected almost entirely with the hook. Closure of the conjunctival-flap suture was carried out. Atropine was used in the case of complete iridectomy and physostigmine in the case of peripheral iridectomy. Then followed subconjunctival reposition of the iris, removal of the bridle suture and closure of both

eyes. In case the capsule ruptures or cannot be grasped by the forceps, the delivery is completed exactly as in the case of extracapsular extraction.

As all operations were performed in a wheeled bed, the patients were returned to their rooms without undue jostling. In every case the eye was dressed at the end of twenty-four hours and subsequently every twenty-four hours. Both eyes were bandaged for from two to four days, and the patients were kept in bed two or three days. The eye operated on was bandaged for from seven to ten days and subsequently was merely protected by dark glasses. Treatment after the operation was merely that indicated by the condition of the eye. Glasses were usually prescribed five or six weeks after operation.

Statistical Analysis

Sex. The sex of the patients in this series is given in table 1.

Table 1

SEX INCIDENCE

	Extra-capsular	Intra-capsular
Males	40	48
Females	60	52

Age. The age of the patients in this series is given in table 2.

Table 2

AGE INCIDENCE

	Extra-capsular	Intra-capsular
Youngest	38 years	28 years
Oldest	88 years	84 years
Average	64.7 years	61.9 years

Owing to the comparatively small number of cases (200), there are no conclusions to be drawn from these figures. The statements of other operators that in young patients the intracapsular extraction is more difficult and less apt to be successful than in older patients can be corroborated.

Type. The types of cataract for which operation was performed are given in table 3.

Table 3

TYPES OF CATARACT REQUIRING OPERATION

Cataract	Extra-capsular	Intra-capsular
Senile immature	25	22
Senile mature	49	42
Senile hypermature	3	3
Immature in a diabetic person	4	2
Mature in a diabetic person	3	4
Complicated	8	17
Tetanic	1	2
Glaucomatous	7	8
Total	100	100

Table 3 is a mere statement of fact and needs but little comment.

Iridectomy. In this series of cases, excision of the iris was performed as shown in table 4.

Table 4

TYPE OF IRIDECTOMY

Operation	Extra-capsular	Intra-capsular
None performed	0	1
Preliminary	25	8
Complete	70	46
Peripheral	5	45
Total	100	100

Preliminary iridectomy was performed in a limited number of cases for one of two reasons. In the first instance, there are a certain number of cases in which the lenses are sufficiently opaque to interfere with the vision necessary for every-day existence, in which there is a definite intumescence of the lenses, and in which progress of the opacity to the surgical point is unduly slow. Extraction of the lens is safer and simpler in the presence of a complete opacity than in the condition of an immature intumescent opacity. In such cases, preliminary iridectomy is justified. In the second place, there are some patients who present a bad surgical risk because of lack of self-control. This can usually be determined while one is washing the tear sac. In some cases, a preliminary iridectomy is justified in order to accustom the patient to surgical procedure. Complete iridectomy was performed for the following reasons: (a) when the pupil was too rigid to permit the passage of the lens; (b) when well-advanced arcus senilis was present, thus covering the colo-

boma; (c) when the iris prolapsed following the incision, although no pressure was made by the fixation forceps, and (d) in cataracta glaucomatosa.

The ideal extraction of the lens should be performed with a small peripheral iridectomy or with incision of the root of the iris, but in the aforementioned cases, the advantages of a round central pupil are overshadowed by the dangers of prolapse of the iris. It is certain that an intracapsular extraction is much less difficult with a complete iridectomy than with a peripheral one, but, on the other hand, the maintenance of a continuous iris diaphragm is of great advantage to an aphakic eye, both mechanically and optically.

Intracapsular delivery. In this series, the intracapsular delivery was successful as shown in table 5.

Table 5

RESULT OF INTRACAPSULAR EXTRACTION

	Cases
Plus (+)	60
Plus-minus (±)	20
Minus (—)	20

For this, the Elschnig method of notation was used: Plus (+) indicates complete intracapsular delivery of the lens; plus-minus (±), a rupture of the capsule at the moment of delivery, after the lens is engaged in the wound, and complete delivery of the cortex and capsule, although not in one piece; and minus (—), rupture of the capsule within the eyeball, necessitating extracapsular delivery of the lens. The lenses that were delivered as + need no comment, nor do the ± cases. The failure to deliver the lens within its capsule occurred in the types of cataract given in table 6.

Table 6

FAILURE OF OPERATION

Cataract	Cases
Tetanic	1
Complicated	5
Hypermature	2
Mature	8
Immature	2
Glaucomatous	2
Total	20

In other words, the type of cataract seems to have but little influence on the failure or success of complete intracapsular delivery. The ages of the patients in the twenty cases were 28, 28, 28, 29, 30, 47, 48, 49, 59, 60, 61, 62, 63, 69, 70, 71, 73, 79, and 84, respectively. The average age was 55.8 years, which is somewhat lower than the average in general. It will be noted that there was a relatively high percentage of patients of comparatively young age.

Needling. In this series of cases, the number of needlings necessary after extracapsular extraction was sixty-one, and after attempted intracapsular extraction, six.

It is realized that 61 percent of needlings after extracapsular extraction is an unduly high percentage, and I cannot account for it. Seemingly, it made no difference whether the anterior chamber had been washed or not, or whether a cystitome or toothed capsule forceps was used. Of the six cases that required needling after attempted intracapsular extraction, two were ± cases and four were — cases. Herein lies one of the great advantages of intracapsular extraction or the attempt thereat.

Prolapse of the vitreous. In this series, the number of prolapses of the vitreous during extracapsular extraction was nine, and during intracapsular extraction three.

In the extracapsular cases, vitreous was lost as follows:

Cataracta complicata: 1 case with complete iridectomy; 1 case with peripheral iridectomy.
Immature cataract: 1 case with peripheral iridectomy.
Mature cataract: 1 case with complete iridectomy; 2 cases with preliminary iridectomy.
Tetanic cataract: 1 case with complete iridectomy.

Thus it can be seen that the type of iridectomy seemed to play no rôle in the production of a loss of vitreous. In the nine cases in which extracapsular extraction was used, the final vision was 0.5 in two cases, 0.8 in one case, and 1.0 in the remaining six cases, showing that in no case did the loss of vitreous damage to any serious extent the ultimate integrity of the eye.

Among the intracapsular cases, vitreous was lost three times. The first was one of mature senile cataract in a 48-year-old man on whom a peripheral iridectomy was performed during the extraction; it was a minus case, and the final vision was 1.0. The second was the case of a 46-year-old woman with cataracta complicata, 18 diopters of myopia, and fluid vitreous. Complete iridectomy was performed and a + extraction. The final vision in this case was 0.4. The third case was one of cataracta glaucomatosa in a 64-year-old woman with mere perception of light. The operation was completed successfully, with complete iridectomy, but on tying the flap suture, the sleeve of my gown caught the lower-lid hook, driving that forcibly against the eyeball with resultant gush of vitreous. The healing in this case was uneventful, but the ultimate vision was mere perception of light, owing to well-advanced glaucomatous atrophy of the optic-nerve head. So in reality the loss of vitreous cannot in justice be charged against the intracapsular operation, which would reduce the figures of loss of vitreous to 2 percent. This is in quite marked contrast to the percentage of loss of vitreous among the cases of extracapsular extraction.

Prolapse of the iris. In this series, the number of prolapses of the iris after extracapsular extraction was nine, and after intracapsular extraction, seven. In the extracapsular series, four of the prolapses occurred in mature cataracts, four in immature, and one in a glaucomatous cataract. In all of them, there had been complete iridectomy. They all occurred between the third and sixth postoperative day. Two were so extensive as to require excision by secondary operation; the other seven were only inclusions of one of the coloboma pillars in the wound and were well covered by the conjunctival flap. The final vision in each case was 1.0, 0.8, 0.8, 0.8, 0.6, 0.5, 0.4, 0.2, and perception of light, respectively. But in all of the cases of poor vision, there was a definite preoperative pathologic entity for a cause. Thus it would seem that a pathologic eye is more susceptible to postoperative prolapse of the iris than a simple senile cataractous eye.

In the intracapsular series, three of the prolapses occurred in mature cataracts, three in immature cataracts, and one in a tetanic cataract. Three were so extensive as to require excision by secondary operation, while the remaining four were small pillar inclusions well covered by conjunctiva. The final vision in each case was 1.0, 1.0, 1.0, 1.0, 0.6, 0.6, and 0.5, respectively. In the latter three cases, there were pathologic conditions in the fundi that accounted for the vision.

I consider this number of prolapses of the iris unduly high, but as the majority followed marked restlessness or nervous vomiting by the patient, I do not see the remedy. In the more recent cases of the series in which a prolapse of the iris or the vitreous might be expected *a priori*, I have used two conjunctival sutures, one at axis 60 and one at axis 120. It is my impression that this procedure reduces the incidence of prolapse.

Astigmatism. In this series of cases, the incidence of postoperative astigmatism was as given in table 7.

Table 7

ASTIGMATISM

Astigmatism	Extracapsular	Intracapsular
Number of cases with less than 0.5 diopter	23	25
Maximum amount of astigmatism	9 diopters	7 diopters
Average amount of astigmatism .	2.20 diopters	2.18 diopters
Number of cases with more than 3 diopters	11	8

There is no practical difference in this respect between the results after intracapsular and extracapsular extractions.

Visual results. In this series of cases, the visual results were as given in table 8.

Vision of 0.6 or better is perfectly satisfactory for the average person, particularly if he has experienced previously poor vision as a result of cata-

Table 8

VISUAL RESULTS

	Extra-capsular		Intra-capsular	
1.0	48	80%	42	84%
0.8	21		29	
0.6	11		13	
0.5	7	20%	4	16%
0.4	2		5	
0.3	6		1	
0.2	1		1	
Less than 0.1	4		5	
Total	100		100	

ract. With vision of 0.6 or better, type of any size used in the average literature can be read with ease, and one must consider such vision to be satisfactory as the end-result of extraction of the cataract. The cause of vision of less than 0.6 is given in table 9.

Conclusions

The conclusions may be divided into statistical and impression conclusions.

Statistical conclusions. The comparison of the results of 200 consecutive extractions of cataracts, one half by the Elschnig intracapsular method and one half by the extracapsular or capsulotomy method, shows but few differences except in the matter of secondary needlings and in vitreous losses. Here the percentage is markedly in favor of the intracapsuar method. In the matter of prolapses of the iris, postoperative astigmatism, and final vision, there is but little to choose between the two methods.

Impressional conclusions. From the work performed in this series of cases, I have gained some definite impressions that cannot be corroborated statistically, but which to my mind are positive, as follows:

The ideal operation for removal of cataract today is the Elschnig intracapsular extraction with a round pupil. That operation, however, is not for the casual operator, but requires the nicety of feel that can result only from continuous operating.

Table 9

CAUSE OF VISION OF LESS THAN 0.6

Cause	Extra-capsular	Intra-capsular
Vision 0.5:		
Vitreous loss	1	0
Glaucomatous atrophy	1	0
Cornea maculae	1	0
Senile atrophy of nerve	1	0
Secondary glaucoma	1	0
Thrombosis of superior branch of retinal artery	0	1
Central choroiditis	0	1
Secondary membrane, but refused needling	0	1
Unknown cause	2	1
Vision 0.4:		
Optic atrophy—unknown cause	1	0
Glaucomatous atrophy of optic nerve	1	1
Old uveitis and retinitis	0	2
Myopic choroiditis	0	2
Vision 0.3:		
Divergent eye	1	0
Old uveitis and retinitis	2	0
Glaucomatous atrophy of optic nerve	2	1
Unknown cause	1	0
Vision 0.2		
Hemorrhagic retinitis	1	0
Optic atrophy—unknown cause	0	1
Vision less than 0.1:		
Glaucomatous atrophy of optic nerve	3	4
Central choroiditis	1	0
Exudative retinitis	0	1
Total	20	16

If the removal of the lens within the capsule is not successful, the operation can be completed as an extracapsular extraction without any added dangers.

After intracapsular extraction there is less irritation of the eye than after extracapsular extraction.

The healing process is more rapid after intracapsular extraction.

There is not the distortion of the pupil following the Elschnig method that occurs so frequently after other types of intracapsular extraction.

In the hands of the experienced operator, the Elschnig method of intracapsular extraction is just as safe, if not more so, than the older capsulotomy method.

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THE CHEMISTRY OF THE LENS

IV. The Nature of the Lenticular Proteins

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BALTIMORE

The relation of the proteins of the lens to its growths, metabolism, senescence, and degeneration is discussed. From the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital, Baltimore, Maryland.

In 1830, Berzelius[1] recorded in his textbook that the lenticular protein was a globulin. In this early vitalistic period of organic chemistry, lenticular protein was probably thus classified, because it possessed properties similar to those of the globule-free portion or globulin of the blood, and not because it was obtained from the globe of the eye[2]. Until the time of Mörner, however, the investigations were sporadic and added little to the knowledge of the lenticular protein. In 1894, Mörner[3] found 35 percent lenticular protein, of which 17 percent was albuminoid, 6.8 percent alpha-crystallin, 11.0 percent beta-crystallin, and 0.2 percent albumin. The insoluble albuminoid was found chiefly in the nucleus, beta-crystallin mostly in the inner part, and alpha-crystallin in the outer part of the lens; the albumin was not localized. The methods which Mörner used for the separation of the various proteins have not been essentially modified by later investigators. Jess[4] has isolated various amino acids from the hydrolysates of the proteins, but his data can not be compared with the results presented here, because of technical reasons. The analytical chemistry of the lenticular proteins has been reported in previous articles[5,6].

The large number of papers on the theories of the behavior of lenticular proteins, and of summaries of the literature on the chemical history of the proteins has made it unnecessary to redigest the previous reports here. The purpose of this communication is to correlate, according to the present knowledge, the life history of the lenticular proteins, beginning with their formation from the amino acids, and ending with their degeneration into amino-acid derivatives.

The Amino Acids in the Lens

The amino acids in the lens have a definite structural significance in relation to the lenticular proteins. After alimentary digestion of protein, a part of the amino acids, which are absorbed by the blood, is distributed to all of the tissues of the body, including the aqueous humor and, in turn, the lens. The quantity of amino acid in the lens varies directly with that in the blood. The rate of exchange of the amino acid between the blood and the aqueous humor, and also between the aqueous humor and the lens is dependent upon the different concentrations of the amino acid in these three media. The total fluctuation of the rate will normally tend to be small. In the lens, only a slight quantity of the amino acids is thus acquired for temporary storage. From this store of amino acids, the lens may take certain acids for its growth, and for replacement of the nitrogenous constituents of the lens used during metabolism. For the formation of new lenticular protein, at least four and probably more amino acids are necessary. Since lysine is indispensable to growth, and tryptophane, cystine, and histidine, to life, it is also probable that these four amino acids can not be synthesized by the lenticular cells. If one of these acids is absent, no new protein can be formed, and therefore, no new lenticular protoplasm can be made. Many of the other amino acids, however, may originate in the lens, and it may not be necessary for them to be brought to it. The amount of arginine, histidine, lysine, cystine, and tryptophane in albuminoid, alpha-, beta-crystallin, and albumin is large. The metabolism of a tissue containing such proteins requires relatively ample quantities of the four

essential amino acids for maintenance and growth. Fortunately, the lens has a low minimal endogenous metabolism in contrast to many other tissues of the body.

The Synthesis of the Lenticular Proteins

Synthesis. The synthesis of a protein, such as a lenticular protein, from amino acids and polypeptides, is frequently regarded as the reverse of the proteolytic process. This theory has never been proved, and the evidence so far is against it. The naturally occurring proteases in the lenticular cells hydrolyze many kinds of proteins. Since the proteins of the lens have quite specific chemical, physical, and immunological qualities dependent upon hereditary factors, it is extremely illogical to suppose that the same proteases which hydrolyze the lenticular proteins are able to resynthesize such specific complex proteins. In other words, the formation and hydrolysis of the lenticular proteins can not be likened as yet to a simple reversible molecular chemical reaction. The synthesis of these proteins may or may not take place by a series of polymerizations, dehydrations, oxidations, and reductions in the manner which was suggested by Pauly[7].

Metabolism and glutathione. In 1912, Reis[8, 9] made the interesting discovery that the nitroprusside reaction for cysteine was positive in the normal lens and slightly positive or negative in senile cataracts. In traumatic and sclerosed cataracts, the reaction was also positive. This observation has been confirmed by Cohen, Kamner and Killian[10], Jess[11], Shoji[12], and Weinstein[13]. The data of Reis are shown in the following table:

THE NITROPRUSSIDE REACTION

Type of Cataract	Cortex	Nucleus
Hypermature	Neg.	Neg.
Mature	67% Neg.	98% Neg.
Immature	15% Neg.	85% Neg.
	10% Neg.	15% slightly Pos.
	75% slightly Pos.	
Tumescent	Pos.	Slightly Pos.
Traumatic	Pos.	Pos.
Sclerosed	Pos.	Pos.

Of the lens proteins, beta-crystallin gave a strong nitroprusside reaction, alpha-crystallin a weak reaction, and albuminoid none[14]. The nitroprusside reaction therefore showed that beta-crystallin was absent in hypermature cataracts and present, in traces, in the mature cataract. The black cataract contained beta-crystallin, but no glutathione.

Goldschmidt[15], after a detailed investigation of the cysteine reaction of lens discovered that the lens possessed an internal autoxidation system with glutathione as the autoxidizable constituent, and beta-crystallin as the thermostabile residue. Practically all of the free soluble sulfhydryl compounds in the lens were reduced glutathione[16]. Uyei[17] found 0.27 to 0.33 percent glutathione in the lenses of the fed and starved rabbit, dog, and guinea pig. Of all the ocular tissues containing free sulfhydryl compounds[12], the lens possessed the largest quantity of glutathione[18]. With aging of the lens or the usual maturation of the cataract, the oxygen consumption of the lens decreased in parallel with the beta-crystallin and glutathione[19, 20], or in other words, the younger the lens fiber, the more the glutathione. The autoxidation process of the glutathione system was greatly affected by the pH[21], temperature [16, 21], and by the presence of iron or copper[21]. A pH below 7.0 prevented the oxidative process of glutathione in the human lens[15]. Without the presence of iron or copper, glutathione was only slowly oxidized. Oleic acid accelerated the oxidative processes affected by glutathione[16]. Kranz[22] found that ultrared radiation produced no effect on the sulfhydryl system, and Jess and Koschella[23], Abderhalden and Wertheimer[21]

found the same to be true of ultraviolet. Shoji[24], Adams[16], and Chalapecký[25] reported to the contrary, that ultraviolet produced a definite effect. Kögel[26] believed that under the influence of light, the sulfhydryl compounds of the lens were reactivated. Schmerl and Thiel[27] observed that the aqueous humor gave a negative nitroprusside reaction, but after damage to the lens capsule, it gave a positive reaction. This may be due to increased permeability of the capsule or to the liberated autolytic products of the injured subcapsular cells. Through autolysis, any dying, or dead, lenticular cell liberates from the proteins soluble sulfhydryl products which are diffusible through the lens capsule[28]. The quantity of glutathione in the lens fiber or cell becomes less as the fiber or cell ages, because the inert albuminoid increases, and the protein metabolism decreases.

The exact significance of the relation between the lenticular autoxidation process of Hopkins-Goldschmidt and the lenticular metabolism can not be judged as yet. The importance of glutathione in the cell of the lens is due to the fact that it serves as a part of an oxidation-reduction system. Glutathione is a tripeptide consisting of cysteine, glutamic acid, and glycine with the cysteine as the reactive group. In the lens, oxidation occurs, with the beta-crystallin, as the thermostabile protein, containing a free sulfhydryl group, as shown by the nitroprusside reaction. In this oxidation, the protein sulfhydryl is oxidized in neutral or faintly alkaline solutions to disulfide, and the nitroprusside reaction of the protein disappears. The beta-crystallin may be reduced again by strong solutions of sulfhydryl compounds, such as cysteine or glutathione, and then reoxidized. Other lens proteins, such as albuminoid and alpha-crystallin, also may be made to act in the same manner after proper treatment[28]. In other words, there is a reversible interaction between glutathione, beta-crystallin and molecular oxygen or an oxygen donator, which oxidizes or reduces proteins. Glutathione, in the reduced form, in acid solutions, also induces a rapid oxidation of lecithin and unsaturated fatty acids, such as oleic acid, while it itself remains unchanged. However, glutathione evidently is in no way associated with the cytochrome oxidation system or carbohydrate oxidation. It has been suggested by Waldschmidt-Leitz[29] that the specific action of sulfhydryl groups and the inactivity of the oxidized sulfhydryl groups in the activation of intracellular proteolysis show the dependence of hydrolytic metabolic processes on the oxidation potential of the cells. Apparently, the direction of protein transformation, whether toward hydrolysis or synthesis, is a matter of oxido-reduction processes. Synthesis, in the presence of sulfhydryl compounds, is probably dominant with high oxygen tension, and autolysis with low oxygen tension[30]. The evidence is that the knowledge concerning glutathione in lens points more toward its effect on protein metabolism and less on inner respiration.

Day, Langston, and O'Brien[31] reported that cataracts occurred in vitamin-G or -B_2 deficiency. Apparently, there is a definite relationship between this type of cataract and the metabolism of the lens. Nagai[32] found the amount of glutathione in muscle greatly decreased, and perhaps absent in this disease. Gavrilescu and Peters[33] noted a lower power of oxygen consumption, and Kinnersley and Peters[34] reported the occurrence of a localized lactic acidosis of the brain tissue in vitamin-B deficiency. Yoshimoto[35] noticed that cold cataract was greater and lasted longer in this same disease. These observations suggest that the cataract of O'Brien is associated with glutathione, protein metabolism, and local acidosis.

The Lenticular Proteins

Growth and senescence. The manner in which the lens grows is significant in the understanding of its chemistry. The cavity of the lenticular vesicle of the embryo is formed from the invagination of the ectoderm. It is filled by the sagittal prolongation of the posterior cells of the cavity. These fibers which traverse the lens form the nucleus. The remaining single layer of anterior cells

of the cavity later forms the lenticular epithelium beneath the anterior portion of the capsule. By the constant process of gradual elongation from meridional rows of subcapsular cells, the lenticular epithelium grows peripherally into long lens fibers arranged in concentric radiating lamellae extending from the anterior to the posterior septa. The outermost fibers are the youngest and the innermost the oldest. The nuclei of the oldest part of the lenticular nucleus disappear. The growth of the outermost layers of the fibers continues into advanced life. In other epithelial structures, such as the skin, the remains of the oldest tissue are exfoliated, but in contrast the oldest fibers of the lens are condensed and form the nucleus. Thus, structurally, the postnatal growth of the lens in size is not directly in proportion to the number of cellular units, but is obviously less. Moreover, if there were no stimulation to cause proliferation of anterior epithelial cells, after prolongation of the last epithelial cells there would be no increase in growth.

The growth of lens may be studied in another manner by plotting the curve of growth. Fortunately, for the purpose of the calculation of this curve, the report of Jess[36] on the weights of the lenses of cattle of various ages is available. Although the data are meager, they are sufficient in number to give a suggestive tentative curve. The weights of the lens for the first two years of life are not acceptable for mathematical treatment, since the growth of cattle during these years, and of other animals during a corresponding period of life, shows a cyclic nature[37]. After the early period of life, however, the growth of the lens is noncyclic and follows the course of a monomolecular reaction. The equation for a monomolecular reaction may be written:

$$x = A\,(1 - E^{-Kt})$$

where x is the weight of the lens at any time, t; A, the weight of the bovine lens at maturity, or 2.6 grams, and K and E are constants. By substituting for the values of A, x, and t, and solving for K, the equation becomes:

$$x = 2.6\,(1 - E^{-0.40t})$$

where t is the conceptional age of the animal. Since the gestational period of the calf is 0.77 years, t in the above equation represents gestational age (0.77) plus age of birth, in order to give the conceptional age. Figure 1 shows the curve of the monomolecular reaction applied to plotted weights taken from the report of Jess. It shows that the noncyclic growth of the lens decreases according to the law of organic growth. The curve suggests that the true senile cataract is the result of the biochemical senescence of the lens.

The interpretation of the curve of

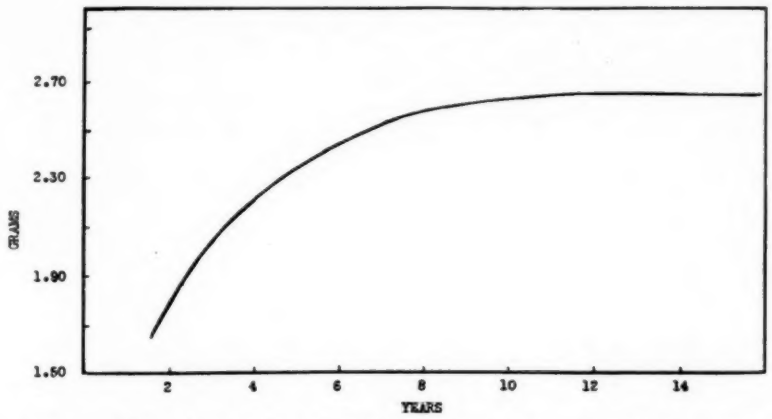

Fig. 1 (Krause). Relation of weight to age of lens. Equation of age-weight curve: $x = 2.6\,(1 - e^{-0.40\,(t+0.77)})$, where x is the weight of any lens at the birth age, t.

growth of the normal bovine lens adds weight to the theory of Vogt that the senile cataract develops as a result of the prolongation of the aging process of the normal lens. It also must be emphasized here that the chronological age does not necessarily correspond to the physiological age of the lens, and that each lens has its own physiological individuality.

The process of growth and senescence of the lens may be demonstrated by the protein partition of the concentric layers of the lens of various ages. According to table 1, the albuminoid increases with the age of the fibers, partly at the expense of the alpha-crystallin. The physiologically active beta-crystallin remains unchanged in concentration except in the oldest part of the nucleus, where the albumin and beta-crystallin are probably decreased by physiological use, or, in part, rendered inert by desiccation. The diminution of the nonprotein nitrogen indicates that the older the fiber processes, the less the nitrogenous metabolism.

It may be said that the process of lenticular senescence actually begins with the early embryonic stages of development. The lens grows old most rapidly when it is youngest. As it ages, less chemical change per unit weight occurs and its metabolism is decreased. In accord with the senescence of other mammalian tissues, the lens loses water and gains in inorganic substances. The permeability of the fibers decreases. During the lenticular growth, the protoplasm which was gradually formed, is transformed into inert substances, such as albuminoid, which are less capable of continuing metabolism and protoplasmic growth than the original protoplasmic protein. Thus, the physiological senescence tends constantly toward protoplasmic stability. The rate at which this transformation takes place is naturally influenced by the individual, species, and other factors. In other words, the lenticular machinery is metabolically clogged by its own physiological growth and in the end tends to stop.

The reversal of senescence or rejuvenescence of the lens in the light of our present knowledge is an improbable process. If the chemical equilibrium could be altered so that the insoluble albuminoid would become the hydrated soluble alpha-crystallin, if the metabolism would be increased, and the capsule and fibers would be made more permeable, there might be a possibility of preventing or delaying senility of the lens.

Distribution of the proteins. Since the growth of the mammalian lens relatively tends asymptotically towards a maximum, the total amount of lenticular protein also tends to follow the same course. As shown by the following data selected from the report of Jess[36], the lens during growth and senescence demonstrates the same physiological disposition as other body tissues[38]. The ratio of water to the total protein, and the alpha-crystallin to the albuminoid, decreases continuously with the age of the lens. The quantity of beta-crystallin and albumin diminishes slightly with the growth[28].

A similar distribution of the lenticular protein occurs in the individual lens, which is a reflection of the chronological history of the lenticular fibers. It has been mentioned previously that Mörner observed that albuminoid and beta-crystallin were in greater amount in the nucleus, and alpha-crystallin in the cortex. Mörner obtained a large quantity of albuminoid, evidently be-

RELATION OF PROTEINS TO THE AGE OF THE LENS

Age	Weight of lens	Total protein	Soluble protein
	grams	percent	percent
5 wks.	0.9309	32.33	24.95
1.5 yrs.	1.8522	34.5	19.93
4 years	2.0508	34.24	19.41
6 years	2.5416	36.0	17.62
12 years	2.6720	35.59	17.69
16 years	2.6788	35.5	16.10

cause he used the lenses of small, old, European cattle, and also, as he stated, because he allowed the protein extract to stand for several days. Unfortunately, many of the American and British investigators have not carefully read Mörner's classical and unusually precise study of the chemistry of the ocular refractive media, and, as a result, his statements have been frequently disregarded and misquoted.

PROTEIN DISTRIBUTION IN THE LENS IN PERCENT

	Mörner	*Krause*
Albuminoid	48.6	12.5
Alpha-crystallin	19.4	31.8
Beta-crystallin	31.4	53.4
Albumin	0.6	1.46
Mucoprotein*	—	0.84
Nucleoprotein	—	trace

* This mucoprotein contains a small amount of nucleoprotein which could not be eliminated due to technical difficulties.

Krause[28] has separated the various proteins of the lens of one-year-old cattle in a more detailed manner, as shown in the following table:

chemical composition regardless of age. In fact, it has not. Analyses show distinctly that albuminoid changes chemically with age as an individual protein. In a strict sense, albuminoid is a mixture of insoluble proteins which are probably derived from alpha-crystallin[28]. The albuminoid is metabolically inert like many of the other structural tissue proteins. It is specially concentrated in the oldest part of the nucleus. Beta-crystallin remains practically constant in quantity during the growth of the lens. In the cortex, the albumin, peptone, and nonprotein nitrogen are naturally in the greatest concentration where the most active protein metabolism is carried on. The beta-crystallin is the metabolically active protein. The mucoid is the cementing substance which holds the fibers together and permits them to move easily. From the above discussion, it is seen that the process of growth of the lens is actually recapitulation of that of the lenticular fibers.

Table 1

THE PERCENTAGE OF NITROGEN DISTRIBUTION IN THE LENTICULAR LAYERS
Fraction of 100 lenses (age, one year).

Nitrogen of lamellae from without inward	FRACTION						Average Percentage of Total N
	I	II	III	IV	V	VI	
Percent of total N of the lens present in each layer	14.7	12.3	18.5	19.6	21.5	13.4	
	percent	percent	percent	percent	percent	percent	
Albuminoid N	0.4	4.8	7.0	9.9	13.2	38.4	11.87
Alpha-crystallin N	37.4	35.1	34.9	33.3	30.7	12.4	31.01
Beta-crystallin N	55.3	54.4	53.5	53.9	53.9	47.2	53.10
Albumin N	2.3	2.4	1.5	1.2	1.1	0.9	1.50
Mucoprotein N*	1.3	1.1	1.1	0.4	0.3	0.4	0.72
Peptone N	0.4	0.4	0.1	0.1	0.1	0.1	0.19
Nonprotein N	2.9	2.8	1.9	1.2	0.7	0.6	0.60

* This mucoprotein contains from 0–20 percent nucleoprotein.

The amount of albuminoid increases with the age of the lens fiber, apparently at the expense of the alpha-crystallin. However, there is no reason to assume that albuminoid is merely insoluble alpha-crystallin, and that it has uniform

The Autolysis of the Lenticular Proteins

Autolysis of the proteins. The autolytic breakdown of the proteins takes place in certain diseases of the lens. Clapp[39] in 1911 observed that the len-

ticular protein was hydrolyzed by the intracellular enzymes. Burdon-Cooper[40], Goldschmidt[41], and Galante[42] also reported on the autolysis of the lens. Krause[6] has demonstrated that there are two kinds of lenticular proteases, which may be conveniently called alpha and beta protease. The beta protease is inactive at the normal pH of the lens, but active between pH 7 and 4. It hydrolyzes beta-crystallin and albumin into secondary products, such as derived proteins of small molecular weight. The alpha protease is active between pH 8 and 3, and hydrolyzes the secondary products, resulting from the enzymatic action of beta protease on beta-crystallin and albumin, into peptones, polypeptides, and amino acids. If the normal pH of the lens is sufficiently decreased, beta protease becomes active and begins the hydrolysis of the beta-crystallin and albumin, and the alpha protease continues the cleavage, until peptones, polypeptides, and amino acids are formed. This acidosis may arise from inflammatory reactions in the eye, decreased blood supply of the surrounding tissues, decreased permeability of the capsule, and by injury or death of the lenticular cells, which may be caused by trauma, age, radiation, or toxin. If the capsule is opened, the enzymes from the aqueous humor and from the leucocytes cause heterolysis of the protein. If the continuity of the capsule is not destroyed, the cleavage products increase the osmotic power of the contents within the capsule, and cause the lens to contain more water. When the cleavage products are able to diffuse through the capsule, the absolute amount of protein is decreased. There is less beta-crystallin and albumin. The osmotic power of the lens is decreased by the loss of cleavage products, and the lens atrophies or shrinks. The albuminoid remains as a contracted residue. The alpha-crystallin may be in solution in clefts formed by the shrinkage of the albuminoid.

A slight injury to the cortex of the young lens may give rise to recovery with little or no visible atrophy, but with a relative marked anatomical atrophy because of the absorbability of the autolytic products of the proteins of young fibers which contain little insoluble albuminoid, while the same injury to the cortex of the senile lens may easily cause a marked visible scar and slight, actual anatomical atrophy, because of the large quantity of insoluble albuminoid which occurs in the older lens fibers.

It has been repeatedly suggested that the cataract of cholera arises from dehydration or, according to Duke-Elder, from hydration of the lens. Because of the extreme loss of water from severe diarrhea, dehydration develops, the nonprotein nitrogen of the blood decreases, and the volume of the urine is greatly reduced. The serum protein may be as high as 10 to 11 percent. The fecal excretion of sodium and potassium may exceed 100 percent of the amount ingested, resulting in depletion of the alkali stores of the tissues, and leading to dehydration of the body. The blood serum becomes deficient in base and bicarbonate with usually a relative excess of chlorides. This condition leads rapidly into acidosis. The generalized acidosis evidently affects the lens, and the autolytic changes initiate the formation of cataract.

Autolysis and calcium. The presence of calcium in unusual concentrations or location in the lens has aroused interest among the ophthalmologists because of its possible relation to cataract, since it has the property of precipitating lens protein. The normal lens contains an extremely small quantity of calcium. Burge[43, 44, 45, 46], Hinrichs[47], Adams[16, 48], Salit[49], Updegraff[50], and Mackay, Stewart and Robertson[51] have reported an exceedingly variable amount of calcium in cataracts. Salit[52], using a large number of human cataracts, the maturation of which was diagnosed by means of the slitlamp, showed that the relative amounts of calcium increased rapidly in proportion to the maturity of the cataract. The average values for calcium were: incipient cataract, 0.0058 percent; intumescent, 0.0305 percent; and mature, 0.0508 percent. Krause[28] has found one cataract containing 2.2 percent calcium.

Any increase of calcium above the

minute normal quantity in the lens is the result of pathological changes, which may take place in many ways. Some of the factors in the deposition of calcium in the lens substance are: permeability of the capsule, local pH of the lens, presence of inert substances, concentration of calcium, phosphate, and carbon dioxide, and, particularly, time. (The presence or absence of phosphatase in the lens has not been demonstrated.) The most common initial cause of calcium deposition is the death of the lenticular cell or cells. As compared with the senile lens, in the young lens with a relatively higher metabolic rate or vitality, and with a higher capsular and cellular permeability, which allows a more rapid attainment of metabolic equilibrium, the cellular injury may be followed by a greater degree of recovery, particularly in the cortical cells. A dying or dead cell tends to become acid in reaction. The acidosis, local or general, initiates the process of autolysis. In the older lens, the acidosis is prolonged because of the increased density of the cells and capsule, which hinders the diffusion of cellular products. The acidosis tends to form acid products, of which carbonic acid, fatty acids, and phosphoric acid from lecithin, kephalin, and nucleoproteins are of interest, because of their relation to calcium. The masked and unmasked lipoids are liberated as fats, fatty acids, cholesterol, cholesterol esters, and derivatives of phospholipins. These lipoids may form globules. Crystals, calcospherites[53, 54, 55], or amorphous precipitates may form through the union of calcium with albuminoid, fatty acids, carbonates, phosphates, and derivatives of phospholipins and nucleic acid which contain phosphoric acid. When beta-crystallin and albumin hydrolyze, the albuminoid remains as a contracted inert foreign body. It is a well-known fact in pathology that calcium tends to be deposited in inert foreign bodies or insoluble proteins, such as tissue albuminoids, which are present after autolysis. This is particularly true if the metabolism of the immediately surrounding tissue is low. This condition is frequently seen in the mature cataract of the senile lens with its "Wasserspaltung." If the whole lens becomes autolyzed in a capsule that remains permeable, the final outcome may be a hard calcified lens. If the capsule becomes impermeable, the result may be a Morgagnian cataract. Other conditions being the same, it is to be expected that the cataract which has the greatest rate of autolysis would acquire the largest amount of calcium for a definite interval of time. The pathological progressive deposition of calcium in the ordinary acquired cataract is thus a secondary effect which follows the usually slow autolytic process.

Attempts have been made to show a relationship between blood calcium and cataract. Adams[48] believed that the serum of patients with cataracts contained abnormal amounts of calcium, but her report was not substantiated by Polichova[56], Krause[28], Tron[57], and Pelláthy and Pelláthy[58]. Levina and Cheifetz[59] found the serum calcium subnormal.

There has been a tendency to associate tetany with the production of cataract. Fischer and Triebenstein[60] found neurological symptoms of tetany and latent tetany in 88 percent of the cases of senile cataract. Investigations of blood calcium in cases of senile cataract have been mentioned previously. There is no doubt, however, that cataract occurs after parathyroidectomy with and without tetany. Tetany as a symptom of excessive motor irritability results when the blood calcium falls below 7 mg. percent, unless at the same time, there is an increase of the hydrogen-ion concentration of the blood or a reduction of the serum protein. Low blood calcium and low serum protein occur in nephritis without the accompaniment of the tetany. Tetany alone has been proved by Eiseman and Luckhardt[61] not to be a cause of cataract. Furthermore, infantile and gastric tetany and tetany of osteomalacia, alkalosis, and other diseases apparently are not associated with cataract. Obviously, it is the parathyroid deficiency accompanied by the low blood calcium that has a bearing on the cause of this type of cataract. Evans and Kern[62] found a large increase

of calcium, but not of phosphate, deposited in the lens, and a decreased oxygen consumption in cataracts caused by parathyroid deficiency. It is not probable that the lens opacity is due only to the passage of calcium from the blood into the lens, since cataract formations are not apparently influenced by diseases accompanied by pathological calcium deposits, which occur in tissues following vitamin-D deficiency or hypersecretion of the parathyroid hormone. The evidence at present is not sufficient to indicate why a decrease of the diffusible calcium of the blood resulting from parathyroidectomy, over a sufficient period of time, produces cataract.

Autolysis and black cataract. The nature of the dark color of brown and black cataracts is actually unknown. The common supposition is that it is formed from tyrosine by means of oxidizing enzymes[63, 64, 65]. Tyrosine exists in the lens as a part of the molecule of the proteins. Human cataracts, including the black cataract, upon hydrolysis contain from 6 to 7.5 percent tyrosine and about 0.8 percent tryptophane[28]. No significant variation is observed in the amount of these two substances in the lens protein of average-sized normal and cataractous lenses. After acid hydrolysis or autolysis, tyrosinase acts on this tyrosine at the proper pH. In certain stages of development, human and animal cataracts give a positive reaction with tyrosinase. Apparently, under usual conditions for the formation of cataract, tyrosinase is not present in the lens, or the formation of dark cataract would occur more frequently *in vivo*, and more easily *in vitro*. Evidently, the presence of an enzyme in the lens which acts on tyrosine or *para*hydroxyphenylalanine has never been proved. The formation of dark-colored substances in the lens after the application of these two compounds may suggest that an enzyme is present, but it does not follow that only an enzyme will give this reaction. Furthermore, the test must be made after the inactivation of the supposed melanin-forming enzymes of the lens, if they are present. Then too, the use of *para*hydroxyphenylalanine in the test for melaninogenic enzymes is questionable, according to many investigators, since it is easily oxidized in alkaline solutions and by many substances in tissues, in the absence of enzymes. Furthermore, it is doubtful whether *para*hydroxyphenylalanine occurs in the pathological lens. Goldschmidt, in his discussion of Jess's paper[66], and Carmi[67] asserted that there is no tyrosinase in the lens. Magnasco[68], Carmi[67], and Neuschüler[69] found no free tyrosine present. Herzfeld, according to Vogt[70], Carmi[67], and Magnasco[68] were unable to demonstrate any evidence of melanin. Takeishi[64] and Corrado[65] detected a substance similar to melanin in black cataract. Unfortunately for investigation, melanin gives an indefinite absorption of colors, except red.

A more probable explanation of the uncertain origin of dark cataracts is the theory of Ropshaw[71]. He believes that the cysteine of the glutathione and protamine of the nucleoprotein (chromatin) are liberated by enzymes which are present in the cytoplasm of the lens. He has shown that when these two substances react, they give a black precipitate. In reference to the lens, the protein of the outer cortical layer, which contains the greatest amount of nucleoprotein and glutathione, is the protein which darkens most intensely upon separation and desiccation. This unconfirmed theory of Ropshaw furnishes the most plausible explanation of color of the brown or black cataracts.

Hydrogen-ion concentration and the proteins. The isoelectric points or zones of the lens proteins are of particular significance, since the maximum precipitation of the protein generally occurs at this point. The isoelectric points of lenticular albuminoid, albumin, mucoid, and nucleoprotein are unknown, but according to Burky and Woods[72], that of alpha-crystallin is about pH 4.8, and beta-crystallin about pH 6.0, when estimated with a colorimetric method. Tsuji[73] reported that the quinhydrone method for ascertaining the pH showed the isoelectric point of alpha-crystallin to be more alkaline than pH 5, and to be decreased by the presence of potassium, sodium, and beta-crystallin. The

isoelectric points of pure lens proteins have not been accurately determined, because improper methods were used, and the temperature, salt effect, and other factors were disregarded.

The pH of maximum precipitation of the highly concentrated mixed proteins in whole lens is naturally different from that of the isolated protein in aqueous solution. Gullotta[74] observed the minimum absorption of water by the lens at pH 4, but Gonçalves[75] mentioned a minimum at pH 4.6, and also pH 8.5. Scalinci[76] stated that the minimum for the cortex was at pH 3.5, and the nucleus at pH 4.5. According to de Haan[77], the lens became completely opaque at pH 5, because of the precipitation of alpha-crystallin. O'Brien and Salit[78], using more exact methods, demonstrated that the isoelectric point of the whole bovine lens was pH 5.16, the cortex 5.10, and the nucleus 5.44. No alkaline isoelectric point was discovered.

The pH of the normal lens was apparently about that of blood plasma, or 7.4[78]. The nucleus was more alkaline than the cortex[76]. Buglia confirmed the relative alkalinity of the nucleus and asserted that the pH of the lens decreased with the increase of temperature[79]. This observation was used by Buglia[80] to explain the formation of cold cataract. Buglia claimed that the low temperature caused the pH of the lens to diminish until it reached the isoelectric point of the lenticular proteins which then precipitated out. Labbé and Lavagna[81] showed that the pH of the normal lens was about 7.5, the senile, 7.6, the immature and mature cataract, 6.6, and the hypermature cataract, 7.8. The range of the pH between 6.0 and 7.8 is most significant pathologically, because in the diseases of the eye it is most improbable that this range is exceeded. This is the range at which autolysis takes place, and in the acidosis of the lens, under only the most favorable conditions does the pH reach as low as 6.0. The importance of the relation of iso-electric points of the lens proteins to cataractous disturbances has been slightly overemphasized in importance.

In such conditions as diabetes, if the pH of the blood is decreased by the entrance of an acid, such as carbonic acid, which is able to diffuse through cell membranes, the osmotically active ions in the cells are increased, and the protein becomes osmotically inactive through the replacement of the active carbonate ion. Consequently, acidification with carbonic acid or other diffusible acids lends to the swelling of the cells and to dilution of their total base contents, while alkalinization has the reverse effect. This may be the explanation of the effects of diabetic acidosis on the refractive properties of the lens.

The Toxic Effects of the Protein Derivatives

The cleavage products, or their derivatives, of many proteins cause pronounced physiological reactions in many tissues. Peptone or proteose intoxication is a typical example, and it is too well known to be described here. Peptone generally produces a greater effect than proteose. Although, physiologically, the amino acids are quite inert in themselves, it is an important fact that the amines resulting from the decarboxylation of amino acids and amino-acid esters are more or less reactive. Histamine from decarboxylated histidine, and tyramine from decarboxylated tyrosine, cause marked reactions, yet histamine-free peptone still produces peptone shock. Evidently, the structural configuration of the amino acids of the peptone and proteose intoxication varies with the kind of protein from which it is derived.

There is no doubt that certain hydrolytic products and their derivatives of the lens proteins cause a local intoxication of the anterior, and more rarely, of the posterior part of the eye, in the same manner. Rötth[82] found that of the amino acids, arginine, tyrosine, and cystine produced a violent reaction when they were introduced into the anterior chamber. Peptone and products from a tryptic digestion of lenticular protein gave rise to a severe iritis. Alpha- and beta-crystallin and cortical protein caused no irritation. The severe ocular reaction resulting from the escape of the liquid contents of the im-

permeable capsule of the morgagnian cataract is definitely referable to the toxic products of the hydrolysis of the proteins. Insoluble masses of albuminoid, especially of the nucleus or of the remains of cataracts, are digested by the aqueous proteolytic enzymes. The insoluble protein is also attacked by the proteolytic enzymes, which are liberated by the death of the leucocytes that migrate into the ocular humors, through the chemostatic effect of the products of enzymatic disintegration of the protein, and through irritation as by a foreign body. The hydrolysates arising in this manner may cause a severe tissue reaction, particularly in adult or senile eyes. The question may be raised, whether or not the secondary glaucoma, which is not the result of the mechanical blockage of the filtration angle, or the iritis following the luxation of the lens into the vitreous, or the spontaneous resorption of senile cataract, may be related to the effect of these proteolytic toxins. This type of inflammatory reaction should be termed endophthalmitis phacogenetica in contrast to the similar reaction, endophthalmitis phacoanaphylactica. The latter is probably a distinctly different process.

The Capsule

The capsule is an elastic membrane enclosing the lens. It is an insoluble albuminoid, and is chemically unlike keratin, elastin, collagen or any othen common albuminoid[5]. The large amount of carbohydrate in the capsule suggests that it is related to the mucoprotein of the lens[28].

In spite of the evidence of past investigations, Löwenstein[83, 84, 85] has advocated the theory of the formation of lenticular opacities from increased capsular permeability. There is no doubt that the capsule is permeable to water and electrolytes[86]. Nicloux and Redslob[87] observed that ethyl alcohol passed from the blood to the lens, and Daniels[88] noted that iodide was transmitted through the conjunctiva to the cataractous lens. Gifford, Lebensohn and Puntenny[89] found the lens permeable to substances with a molecular weight below that of the large colloidal molecules. Friedenwald[90, 91] studied the permeability of the isolated capsule. The permeability was decreased with the age, with increasing molecular weight of the diffusing substances, and by the presence of calcium and cyanide. In Friedenwald's experiment, the increasing permeability of the capsule in rapidly induced cataracts, was probably due to the stretching of the capsule by the lens, which, during rapid autolysis, undergoes marked swelling. Friedenwald also produced cataracts *in vivo* by decreasing the permeability of the capsule. Schmerl and Thiel[27] noticed that the damaged capsule allowed substances that gave a positive nitroprusside reaction to pass through to the aqueous humor, which normally contained no such substances. These latter investigators, however, undoubtedly damaged the lenticular cells as well, for otherwise it is not probable that the oxygen consumption of the lens would occur in such large quantities.

The permeability of the capsule is definitely related to certain types of cataract. If the capsular permeability is sufficiently decreased so as to prevent the minimal exchange of metabolites between the lens and the aqueous humor, which is necessary for life, the lens cells die and autolysis begins with the lowered pH of the lens. This event may occur after a plastic iritis in which a fibrinous exudate covers the lens. Many other diseases may also produce the same effect. The density of the senile capsule may be a factor in the production of subcapsular cataract by causing the vitality of the aged lenticular cells to diminish. The impermeability of the lenticular capsule of the Morgagnian cataract is well known. However, diminished permeability of the capsule is not the usual initial cause of most cataracts.

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VOLUMINOUS ORBITO-CRANIAL OSTEOMA, CONSEQUENT CEREBRAL ABSCESS OF NASAL ORIGIN

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This report is a sequel to a case history reported four years ago, covering the eradication of a large osteoma of the orbit. The present report records the recurrence of the osteoma, originating this time in the ossification of a fibroma, together with a large abscess of the frontal lobe.

In 1930, I published the case report of a young girl, who had consulted me because of a large osteoma of the orbit. This I removed, without enucleation, by a supraciliary incision, conserving for the affected eye its entire physiological function. In addition to this tumor, my patient presented, on the corresponding side, a peripheral facial paralysis. By the elimination of possible causes, I classified this affection, which was cured within four months, as being *a frigore*. The ethmoid bone had been the point of origin of the neoplasm, and in spite of its radical removal, a recurrence appeared at the same place, a few years later. However, the chief items of interest in the present case report are that this time the osteoma, originating in the ossification of an initial fibroma, had first invaded the orbit; that afterwards it extended to the cranial cavity; that it spread infection to the brain; and that during operation I discovered a vast abscess of the frontal lobe. In view of these facts, and of the medical literature I have perused, I believe this case report to be the first ever published on such a subject. The subsequent history of my patient, who died of diffuse leptomeningitis, twenty-eight hours after operation, follows:

Case report: Miss C. N., aged 24 years, was admitted to my service at Notre-Dame Hospital, on January 26, 1933, for an affection in the right oculo-frontal region. This patient, from whom I had already removed an osteoma of the orbit weighing twenty-eight grams, on the 8th of May, 1925, related that after the operation she enjoyed an excellent state of health until October, 1931. She noticed, from this time on, a sensation of fullness in the orbital cavity, without any feeling of pain. The eye began to be projected forward very slowly, but vision remained good, and she never complained of diplopia. Headaches were localized to the right, and, starting from the frontal region, appeared in about one month.

On examination I observed a slight direct exophthalmos of the right eye, which, nevertheless, retained all its mobility. The lids exactly covered the cornea, whose sensibility was perfect. The pupils reacted well to light. Epiphora existed in the presence of quite permeable lacrimal ducts. The papilla was normal, as were also the membranes of the ocular fundus. With the diploscope of Rémi, I noticed a good fusion of images. Nothing interesting was found in the left eye and vision of both eyes was 1/3; but after the correction of a mixed astigmatism it rose to 2/3.

O.D. + 2.25 D. sph. ⊂ — 0.75 cyl. axis 105°
O.S. + 2.00 D. sph. ⊂ — 0.50 cyl. axis 120°

The right orbital roof was painful on pressure, and, with the small finger, I felt a neoplasm when luxating the globe slightly downwards. The patient complained of headaches localized in the frontal region of the corresponding side.

On anterior rhinoscopy I found a right nasal fossa without pus, absolutely free, but presenting anosmia. There existed on the left a slight spur of the septum. On this side the sense of smell was normal.

The pharynx and the cavum offered nothing particular.

Diaphanoscopy allowed me to see that all sinuses of the face were quite transparent.

In the presence of an exophthalmos in a patient who had already been operated on for an osteoma, I immediately thought of a recurrence, and asked for a roentgenogram. Dr. Laquerrière, accordingly, gave me the following information:

"Antero-posterior view indicated complete opacity of the right orbit; corresponding frontal sinus normal.

"Lateral view showed an irregular bony tumor, greater in size than a large nut, the anterior part being in the posterior part of the orbit, and the posterior part in the cranial cavity" (fig. 1).

The patient, who had a temperature of 102.4°F. was immediately ordered to bed, and I told her that before removing the tumor, it would be necessary to enucleate the eye, and that operative intervention might offer serious consequences. Impressed by these explanations, she asked to be allowed to consult her family. During the following days, the symptoms grew considerably worse. Indeed, headaches became more intense, temperature oscillated between 97° and 100° F. and she vomited. From time

to time she suffered from insomnia or was in a torpor. By lumbar puncture we obtained a clear liquid which escaped without pressure from the canula. Analysis of this liquid gave the following results: Lymphocytosis, normal. Bacteriological examination, negative. Albumen, 0 gr. 60. Gum — — — —

Blood test gave a negative Wassermann reaction, and a normal quantity of urea.

Traces of albumen were found in the urine, but no sugar.

During the second week after the admission of the patient to the hospital, the nervous condition increased, and headaches became more and more severe and persistent. Her temperature was always a little above or below normal, accompanied by somnolence or want of sleep. Nevertheless the papillary discs were not choked, and vision was good. On the 9th of February, I reiterated my advice that she submit to surgical intervention which, this time, was accepted and took place on the following day.

Operation.—Due to the condition of apathy manifested by the patient, the anesthetist administered rectally 6 c.c. of avertin, which produced an ideal sleep. After sterilizing the field of operation, I performed an external canthotomy, followed by an exenteration of the orbit. I then discovered a bossed osteoma filling all the superior half of this cavity. From its adhesions, it was easy to conclude that the neoplasm had its origin in the ethmoid bone. Using the gouge and mallet, I freed its nasal implantation. The tumor was spongy at certain places, and as I did not wish to risk fracturing the thin walls of the orbital cone, in trying to remove it in one piece, I sectioned it with a cutting forceps. Once I had arrived at the bottom of the cavity, I very carefully mobilized its cranial part with a lever. During these maneuvres, I was exceedingly surprised when I saw, gradually flowing out from the frontal lobe, about 20 c.c. of pus. Needless to say, the last portion of the osteoma was removed in trying to prevent dissemination of the infection. The intervention, which had presented no difficulty, was finished with a few sutures in the external canthus, drainage of the abscess, and an aseptic dressing. Though the loss of blood was very small, I prescribed 500 c.c. of glucosed serum by intravenous injection and 2 c.c. of coramine intramuscularly, in order to minimize somewhat the shock produced by the operation. The awakening was normal, and the following night sleep was calm. However, the next day, the patient complained of head aches, had incontinence of the bladder, and vomited. Fever reappeared and gradually increased. She became unconscious in spite of all the stimulants administered, and then went into delirium. Respiration rose to 40, the pulse to 160, and the patient died twenty-eight hours after the operation with a temperature of 103.1° F.

The autopsy, performed by associate Prof. Simard, permitted us to make, among others, some very interesting observations of the orbito-cranial region.

"The right eye is absent as well as the orbital roof. The orbital cavity is filled by a clot of blood which is continuous with another clot adherent to the right frontal lobe of the brain. The right frontal sinus is intact.

"On the inferior side of this lobe, there is a loss of substance in the form of a cupola, four-and-one-half centimeters in the transverse diameter, four centimeters in the antero-posterior direction, and having a depth of two centimeters. This loss of substance is replaced by a red blackish mass, striated with gray bands, which is continuous with the clot of the orbit.

"The bulb and the olfactory nerve of the same side are destroyed.

"The borders of this cupola, with the microscope, are found to be constituted of segmented cerebral tissue, strongly infiltrated with red corpuscles. The bottom is carpeted with a purulent layer.

"There exists, moreover, a diffuse leptomeningitis." (See figure 2.)

The fragments of the tumor when reunited weighed forty-three grams, and from the microscopic point of view, it was embedded in the orbit, as well as in the cranial cavity, presenting at certain places spongy parts, or very hard ones.

Prof. Pierre Masson, who made the anatomo-pathological examination of a piece of the neoplasm which had grown into the skull, gave me the following report:

"The tumor has a hemispheric form, and is fused with the orbital roof. It is very hard, and must be divided into slices with a fine saw.

"It comprises two regions of different structure. One external, or cortical, formed by a very compact bony tissue having narrow Haversian canals and resembling that of the diaphysis of a long bone. The other, deep, is formed by a tissue of variable structure according to the location: this tissue is fibrous in places, very dense and has large capillary vessels running through it. Elsewhere osteoid canals spring up in places.

These osteoid extensions are continuous externally with the compact bone which forms the superficial region of the tumor. Between these young trabeculae, there are only fibrous tissue and vessels, no red marrow.

"The bony tissue seems to be altogether stable in the compact region. The Haversian canals are not bordered by osteoblasts in epithelioid arrangement—sign of bony increase—or by myeloplax included in the lacunae of Howship—sign of resorption. We find pictures of increase and resorption (these very rare) only in the deep region.

"This tumor is a pure osteoma springing from the direct and progressive ossification of an initial fibroma. In no place did the tumor present the least inflammatory lesion, either on its surface or in its interstices."

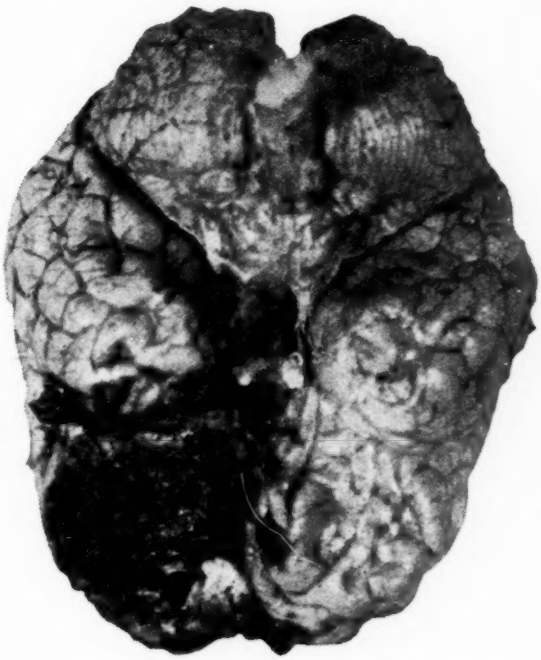

Fig. 2 (Roy). Photograph of the brain removed at necropsy.

Fig. 1 (Roy). X-ray photograph of the skull, showing the location of the tumor.

In estimating the facts brought to light in this case report, I shall avoid repeating, as much as possible, what I have already said in the publication of my first paper. I shall, however, recall that my patient had never formerly had any infections of the nose, that she had never received any trauma on the nasofrontal region, and that her orbital osteoma had sprung from the ethmoid bone without any apparent cause. This tumor, particularly hard, had been totally removed in 1925. Wishing to know, therefore, its imperviousness to the x-rays, I had it radiographed with the head of a small statue in ivory, of a size relatively equal to that of the neoplasm. This indicated the same opacity for the two objects. (See my illustration, Ann. d'Ocul., 1930, Oct., v. 167, p. 830.)

According to the history of the patient, there was no obvious recurrence for six years.

However, it would be logical to believe that the relapse had begun before October, 1931, and that the first manifestations had been unperceived. It is well known that, in general, osteomas of the orbit have a rather slow development; hence, the neoplasm of the patient would scarcely have attained a volume of forty-three grams in the space of sixteen months.

The anatomo-pathological examination has furnished information of special interest. Indeed, it has been demonstrated that the tumor, developed on the old cicatricial tissue of the ethmoid bone—observation made during operation—had at first been a fibroma which, in process of time, had progressively undergone ossification. Contrary to what I had found during the first operation, where the osteoma, very hard, had invaded the orbit in pushing the eye forward, its relapse offered a consistence semi-spongy semi-ivorylike, prolonging itself in depth into the cranial cavity, and causing only a slight exophthalmos.

Let us see now in what manner the brain was infected. At diaphanoscopy, on roentgenogram, and especially at necropsy, the frontal sinus corresponding to the tumor had been found absolutely normal. We must then admit that the microbic agent had its point of departure in the nasal fossa, and that it slowly reached the meninges—by the posterior way of the neoplasm most probably. If the patient had never presented retrobulbar abscess, it was because the infection, chronic at the first onset, with a very slow development, had never manifested itself under an acute or subacute form, following a severe rhinitis, for example. Though the fragment of the intracranial tumor examined under the microscope did not show any inflammatory signs, this fact does not affect the hypothesis that the microbes coming from the nose had proceeded to the brain by the cortical part of the osteoma. The cerebral pulsations, transmitted to the meninges in contact with this one, had, in time, produced an erosion of the dura mater, by which infection then propagated itself to the frontal lobe. It would not be reasonable to suppose that the microbic agent had followed the cribriform plate of the ethmoid bone to reach the brain, because the patient, since her first operation, had never had ethmoiditis; furthermore, at my examination the right nasal fossa was normal; and, lastly, at the autopsy no pathological finding was observed in the region of the cristagalli apophysis.

I regret not to be able to furnish a microscopic report of the pus evacuated from the abscess of the brain; unfortunately it had not been requested. However, virulence of this pus must have been very great since twenty-eight hours after operation, the patient died with a temperature of 103.1°F. Moreover, associate Prof. Simard, who made researches on the cerebral sections limiting the abscess, found that this tissue was parceled and strongly infiltrated with red corpuscles, that it was carpeted by a purulent layer, and finally that there existed a diffuse leptomeningitis.

At the time of the clinical examination, I observed that the right nasal fossa, although quite free, presented anosmia—but that the sense of smell was normal on the left side. This phenomenon is explained by the destruction of the bulb and of the olfactory bundles, consecutive to the abscess of the corresponding frontal lobe.

I would emphasize the fact that in spite of the fairly considerable development of the cranial osteoma, the papillae, on ophthalmoscopic examination, were not choked and that on lumbar puncture the liquid escaped without pressure. Moreover, vision of the right eye had always remained good, since the orbital neoplasm had invaded only the superior part of this cavity, without coming in contact with the optic nerve.

The clinical symptoms and the roentgen examination did not allow me to make a diagnosis of abscess of the frontal lobe, for the headaches in this region could well have been due to the tumor, and the rise of temperature, as well as the vomiting, to a reaction of the meninges. However, had I thought of such a complication—observed for the first time—it would have been instruc-

tive to see what would have been the results of ventriculography.

To sum up this case report, which is of peculiar interest, I would say:

1. That my patient, in 1925, had been operated on radically for an osteoma of the orbit, which had developed from the ethmoid bone, and had the consistence of ivory;

2. That the cure maintained itself, apparent, until 1931;

3. That from this time on a recurrence was manifest in the form of a fibroma starting from the nose;

4. That this initial fibroma underwent ossification;

5. That this tumor invaded at first the superior half of the orbit, and then the cranial cavity;

6. That the nasal infection propagated itself by means of the tumor to the brain;

7. That during the operation an abscess of the frontal lobe was discovered;

8. And, finally, that this patient died of diffuse leptomeningitis twenty-eight hours after intervention.

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CAUSES OF REACTIONS FOLLOWING O'CONNOR CINCH SHORTENING OPERATION

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In the performance of muscle operations, it should be remembered that tears contain lysozyme, a bactericidal enzyme widely distributed in bodily secretions and tissues. Its valuable properties should not be impaired in the preparation of the surgical field. If untoward tissue reactions are to be minimized, attention must be given to the hydrogen ion concentration of the solutions which come in contact with the tissues and the inadvertent introduction of foreign matter must be scrupulously avoided. From the Department of Ophthalmology, Children's Hospital.

"It is asking a good deal of an antiseptic, any antiseptic, particularly a chemical antiseptic to differentiate between malevolent bacteria and normal tissue cells which we do not wish to annoy, much less destroy."—Professor Chauncey D. Leake.

Ophthalmologists tend to lag behind their colleagues in other fields in an appreciation of this principle. It was not long after the introduction of antiseptics into medicine before the general surgeons learned that they could not augment the natural defenses of the peritoneum, for example, by pouring in antiseptic solutions and that such solutions were actually detrimental. They consequently gave up the practice rather promptly. Obstetricians have learned that if the uterine cavity is not contaminated during labor and the antisepsis of the puerperal state is left to nature, the best results are obtained.

For a history of the study of the natural defenses of the eye I can do no better than to quote from Duke-Elder*.

"The bactericidal properties of the lacrimal secretions have excited a considerable amount of attention. It has long been recognized that tears form a bad culture-medium and that they remain sterile indefinitely; but summarizing the knowledge of his time Schirmer (1904) considered that this antiseptic action was insignificant. Although it has been denied (Bono and Frisco, 1901; Nedden, 1907), it has been established beyond doubt that this bactericidal property is abolished on boiling (Helleberg, 1901), a peculiarity which Lindahl (1907) showed to be due to the presence of an enzyme substance: this was identified as lysozyme by Ridley (1928).

"Lysozyme, an enzyme described by Fleming (1922), is found in minute quantities in all animal tissues and in most secretions, but is present in concentrations sufficiently high to be bactericidal in the white blood corpuscles, in nasal mucus, sputum, and in tears. It is a colloid which is readily fixed by lecithin and fats as an absorption compound, but which is destroyed by heating to temperatures of 75 degrees C. or by traces of free acid or alkali (Wolff, 1927). Depending on the concentration in which it is found, its action upon bacteria varies from an inhibition of growth to killing by lysis; its relative concentrations in various regions are tears, 100; leucocytes, 100+; sputum and nasal mucus, 33; saliva, 1; cartilage, 10; egg white 200. With the normal concentration of lysozyme in tears, bacteria such as staphylococci, streptococci, gonococci are readily killed, while tubercle bacilli are killed with a concentration twice this amount. In conjunctival infections the lysozyme content may be considerably below the normal, and recovery from infection is usually accompanied by an increase in its concentration; it is further of considerable importance that in sustained epiphora the lysozyme content falls below half the normal level, presumably by dilution (Ridley, 1928; Cavka and Prica, 1929; Hallauer, 1930)."

There seems to be no question that this enzyme constitutes, if not the principal defense of the conjunctiva and cornea against infection, at least a very important factor in this defense, yet the routine preparation of patients for ophthalmic operations usually includes procedures which destroy it, impair its efficiency, or at least wash away the available supply.

According to Dr. Fleming[1] lysozyme action takes place only when the medium is approximately neutral. The action is delayed when the medium contains as little as 1/8000 normal acid and 1/24,000 normal alkali and complete inhibition takes place when the fluid contains 1/800 normal alkali. In terms of hydrogen-ion concentrations this means that its action is impaired when

*Textbook of Ophthalmology by W. Stewart Duke-Elder, page 640, 1932 edition.

the pH is below 3.9 or above 9.7 provided the acid or alkali is completely ionized. In actual practice the acids and alkalis used are not completely ionized and therefore much smaller deviations from the neutral point undoubtedly are detrimental to the action of lysozyme. It is unfortunate that hydrogen-ion determinations were not recorded in this otherwise carefully controlled experimental work.

Fleming and Allison investigated the effect of chemicals on the action of lysozyme. Lysis was most rapid when the salt content was 0.5 percent. There was marked inhibition in a concentration of 2 percent and in 5-percent salt solution the lytic action was practically abolished. They showed quite definitely that the antibacterial element of the tears was much more susceptible to destruction than were the common pathogenic bacteria, such as the staphylococci. In other words, such antiseptics as chloramine T, iodine, carbolic acid, and others destroyed lysozyme in concentrations that had no effect on a pathogenic bacterium such as the staphylococcus.

Let us consider what happens to the protective ferment lysozyme during the usual preparation of an eye for operation. The soap solutions commonly used frequently have a pH of 8.8 or more. Inevitably in the process of scrubbing, this alkaline solution comes in contact with the conjunctiva or cornea to a greater or less extent. Patients complain of the burning sensation produced even when the scrubbing is done after the eye is cocainized and complain bitterly if some of the solution flows over the bridge of the nose and into the conjunctival sac of the eye in which cocain has not been instilled. The scrubbing with soap is commonly followed by a copious and forceful lavage of the conjunctival sac by a wide variety of solutions containing chemicals in concentrations which certainly impair the integrity of the lysozyme. If they do nothing else, they mechanically wash away the existing supply of the ferment. It is not improbable that the reason that we are able to operate without having infections occur in every case, so prepared, is because the ferment is rapidly replaced.

It is common practice to drop saturated solution of boric acid on the cornea to keep it moist. The pH of this solution is 5.2. Even in hospitals where some attention is paid to these matters the pH of physiological salt solution is not carefully controlled and considerable variation will be found. Where strong reagents are used in cleaning the containers, very persistent washing is necessary to insure neutrality, even when the distilled water is above reproach. In one hospital where the O'Connor operation is used, it has been the practice to boil the dermal in a sodium bicarbonate solution, the pH of which was 8.6. Unless this solution is washed off with great care, tissue reactions can hardly be avoided.

The water in which instruments are boiled is frequently far from neutral and a certain amount of alkali may easily be introduced into the operative field from this source. Particles of scale, rust, and lint must be guarded against with the greatest care. The untoward effects of cotton fibers, talcum powder from gloves, and antiseptics used in preparing the hands of the operator have already been discussed[2].

The work of Clifford Walker[3] demonstrates beyond question the importance of minute foreign bodies as a cause of reactions in intraocular operations. While this factor is by no means so important in operations on the extraocular muscles, attention to these details will practically eliminate postoperative reactions.

In our series of 79 cases, no reactions beyond mild swelling of the bulbar conjunctiva have occurred, except possibly in one case done in Chicago, on which complete postoperative notes are not at hand. We believe that if, in addition to proper asepsis, the exclusion of foreign matter is meticulously observed and if gross changes in the hydrogen-ion concentration are avoided, reactions will not occur sufficiently often to constitute a valid objection to the O'Connor procedure.

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EXTRACAPSULAR CATARACT EXTRACTION COMBINED WITH POSTERIOR CAPSULOTOMY

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In the writer's experience the best method of avoiding after-cataract has been posterior capsulotomy immediately following extraction of the lens. The procedure is described.

One of the most unfortunate contingencies occurring in ophthalmic practice is the clouding of the posterior lens capsule following a cataract extraction and the resultant obscuration of vision. An unfortunately large percentage of patients, who have waited for months or even years for the eventful day when they were to have their cataracts removed, have, soon after extraction, been doomed again to lapse into a condition of semiblindness because of opaque lens capsules. Many such patients, discouraged and shaken in confidence, have never given their consent to another operation. Others, who have been willing to submit themselves the second time to a surgical procedure, have often become victims of one or more of the many complications which frequently attend even such an apparently simple procedure as a discission. This operation, when incompletely performed, naturally results disappointingly; therefore, in the minds of relatives and friends, there will be a doubt as to the ability of eye surgeons in general. The surgeon, while making a discission, may encounter one or more of the many hazards attending this character of surgery. Traction produced by the knife, for example, may cause an iridocyclitis, which is apt to terminate fatally to the vision; or an infection of the cornea may occur and, being rapidly transmitted to adjacent structures, may terminate in a partially disabled or totally lost eye.

So far as can be conclusively traced in literature, Daviel was the first surgeon to extract a crystalline lens through an incision in the cornea. These early extractions consisted only in the removal from the anterior chamber of lenses which had previously been "couched" or pushed backward into the vitreous and which had later fallen forward into the anterior chamber, obstructing vision. These extractions of Daviel were performed during the late forties of the eighteenth century. Soon thereafter, cataract extractions, with a technic similar to that practiced today, were tried out by practically all the ophthalmic surgeons of the world, and reports glowing with enthusiasm were made by many of the most renowned surgeons of the time. Shortly thereafter, however, the popularity of the operation began to wane and continued to do so to such an extent that Scarpa, as late as 1803, as well as Desmarres, Sichel, and others of equal renown were advocating a return to the old operation of couching. Their patients, to all appearances successfully operated on by linear extraction, were again losing their vision. At that time the ophthalmoscope was unknown, and the principle of reflected light was not understood. As a consequence, the reasons for these patients' lapsing again into blindness or semiblindness were for the time clouded in mystery. Since then modern experience has made these reasons all too obvious.

We know now that there are a variety of ways in which the lens capsule, fol-

lowing a cataract extraction, may become impervious to light rays and thus diminish vision. The most common of these is a wrinkling and an overlapping of the surfaces of the posterior capsule. This tendency of the capsule to become corrugated is due to the fact that the membrane, originally convex and projecting posteriorly, falls forward after extraction and changes the previously taut, bulging capsule into a flat, redundant curtain which is much too broad for the space it occupies. As a result of this folding and wrinkling, the capsule obstructs the passage of light rays, which thereby become dispersed in all directions.

Often, also, an actual postoperative thickening of the lens capsule is seen, ordinarily the result of a regeneration of lenticular cells. Such opacities, sufficiently dense to obstruct light rays, usually occur as dark spots upon the anterior surface of the posterior capsule. Possibly, however, the most frequently seen capsular opacity is that caused by particles of cortical lens matter falling directly upon the anterior surface of the posterior capsule. It is true that much of this cortical lens tissue is eventually absorbed by the aqueous humor; but even so, there are shreds left which adhere to the capsule and which are of sufficient density to obstruct light rays. These shreds of lens tissue alone may cause partial blindness.

In addition to these simple forms of capsular opacities are those dense exudates which are often found upon the capsule as secondary manifestations of postoperative inflammations of the iris or of the ciliary body. Such exudates may not only completely obstruct the rays of light through the capsule but also may add to the gravity of the situation by creating permanent synechiae between the capsule and the iris.

The question has often arisen, following a cataract extraction, as to why the anterior capsule does not as a rule give any trouble in the way of obstructing light rays. The answer is simple. In extracapsular extraction for cataract, an incision, usually a large crucial one, is made in the anterior capsule. During the delivery of the lens, the free edges of this opening are further torn and thrust aside to a place in which they remain, since there is no mechanical reason for a return to their original site. With the posterior capsule these reasons do not apply.

Of late years, attempts have been made to get away from the menace of the opaque capsule by removing the lens with its entire capsule intact. Numerous procedures have been originated with this end in view but the intracapsular operation has not been accepted by the average ophthalmologist for his own use. The obstacle of postoperative capsular opacity in the extracapsular operation, however, is ever before him; and this alone has caused some to perform intracapsular extraction with its attendant possibilities of disaster.

Several years ago I adopted a method of extracapsular extraction, which, while it may not be wholly original, was, so far as I know, first performed by me as a more or less routine practice in cataract surgery. This consists of a combined extracapsular extraction, immediately followed by a posterior capsulotomy. During a cataract extraction in which an unusual amount of cortex remained in the anterior chamber, after removal of the nucleus, I made an incision in the posterior capsule because the patient had become unruly and the cortex could not be successfully removed. This was an emergency measure instituted with the idea of preventing cortical obstruction of vision, at least at the point of incision of the posterior capsule. I remember that, following this operation, I passed several days of anxiety conjuring up all kinds of possible complications, none of which presented themselves. On the other hand, the visual results in this case equalled any that I had ever had. This gratifying termination of a seemingly bad plight caused me, sometime later, to repeat the procedure for experimental purposes with results so favorable that I have adopted the method more or less as a routine. Occasionally, a mild iridocyclitis has followed; but in no instance has it proved resistant to treatment. At first I was fearful that the herniated vitreous would get into the corneal

wound and thus prevent union of the section. This untoward result has never occurred. On the other hand, a limited herniation of the vitreous has proved to be a decided advantage. The posterior capsulotomy when cautiously made limits the vitreous hernia so that it protrudes only sufficiently to hold the incision in the capsule open. Lens particles may adhere to the surrounding capsule, but the open area remains free of extraneous lens tissue. Thus we see that upon this herniation of the vitreous the success of the operation depends because it makes the opening in the capsule permanent. Occasionally, a small amount of vitreous may be lost; even a moderate loss of vitreous may be considered of little importance, a fact attested to by Smith, Barraquer, Fisher, and others. According to these authors, only a pronounced loss of vitreous, leading to a detached retina and an intraocular hemorrhage, is to be dreaded.

In this article I shall attempt to outline the steps of the extracapsular operation with associated posterior capsulotomy as I have long practiced them, each step of which, I believe, has a more or less direct bearing on the success of the operation.

A corneal section for a cataract operation to be followed by a posterior capsulotomy may be made in the ordinary manner. It should be sufficiently large to permit the expulsion of the lens without traumatizing the corneal wound margins. Too large a section should be avoided, however, as it predisposes to eversion of the corneal flap. Formerly, I made a conjunctival flap, a procedure which I have now abandoned, yet one which undoubtedly has the advantage of enabling the surgeon to make the corneal incision more secure. This is especially true if the flap is sutured. It should be remembered, however, that a conjunctival flap is often followed by hemorrage into the anterior chamber, which, unless the blood is removed by irrigation, obscures the field of operation so that the iridectomy and capsulotomy are both done with difficulty. I have seen this occur a number of times; for this reason more than for any other, I usually perform the corneal section without the conjunctival flap.

The closing of the wound with a conjunctival suture above and an intracorneal suture below has many advocates. Unquestionably this procedure lessens the chances for prolapse of the iris, but this is not to be considered much of a factor when a broad iridectomy is performed. It is further claimed that such a suture permits the patient to move around with less danger of opening the wound; but, on the other hand, it is a source of constant irritation to the eye. The suture also requires removal and this, at a time when the patient is subject to photophobia and blepharospasm, makes it a much dreaded step by the patient. While this type of suture is worthy of consideration, after weighing the hazards versus the advantages of its use, the conservative surgeon will probably not adopt it as a routine measure. After having practiced it more or less extensively, I seldom use it now, at least not at the time of the primary extraction. In two or three instances, however, in which the border of the corneal flap had rolled outward some time after the operation, I have found an intracorneal suture invaluable; and by its employment, I believe I have been able to save eyes that otherwise would have been lost.

I have long observed that the manner of dealing with the iris during a cataract operation also governs in no small degree the tendency to the formation of opacities in the posterior lens capsule. Iridectomy, for instance, if properly performed, is always a safeguard to the future transparency of the capsule. Many surgeons, in my opinion, are defeating their own efforts by not using iridectomy on the grounds that, when the iridectomy is dispensed with, the pupil has a more natural appearance, and that the amount of light entering the eye may be regulated by the iris in a more normal manner than when iridectomy is performed, because there is a great likelihood that an iris thus spared may get into the corneal wound and form, thereby, a cystoid cicatrix, which encourages bacterial invasion of the eye. The omission of the iridectomy

predisposes the capsule to opacity for two reasons. The first and principal reason is that there is less room afforded for sweeping the cortex out of the anterior chamber. Extraneous lens matter, when left behind, is mechanically distributed over the capsule by the aqueous, which quickly reforms and, adhering to the capsule, predisposes to opacity. The second reason is that during expression without iridectomy much of the cortical matter of the lens falls behind the iris, which acts as a dam and thereby creates a permanent cortical accumulation.

With iridectomy, the incision need not be so large as when the simple operation is done, and the lens may be delivered with less difficulty because its progress through the incision is not impeded by a resistant iris. An iridectomy, whether preliminary or done at the time of the extraction, should be both broad and deep.

Next in importance to the iridectomy, so far as preventing after-cataract is concerned, is the manner in which the anterior capsulotomy is performed. It is most important that the opening in the anterior capsule should be made broad and free. In performing the capsulotomy, I have at various times used both the capsule forceps and the cystotome. The latter is to be preferred. Its use does not produce so much traction on the ciliary body and thereby does not predispose, to such a degree, to iridocyclitis as does the method of tearing away the anterior capsule with the forceps. A broad cystotomy, whether crucial or fan-shaped, provides a larger opening in the capsule because the flaps thus created roll up. This affords an unusual degree of space between their borders. In making a fan-shaped capsulotomy, the cystotome should be made to engage the capsule at its center under the border of the iris. The instrument may then be drawn upward and toward the temporal side so as to create a semilunar or elliptical incision. In the same manner the incision is made from the nasal side of the capsule. The effect of this procedure, originated by Bark (Amer. Jour. Ophth., 1903, October), is to form three fan-shaped flaps, which, contracting and rolling upon themselves, leave a large circular opening in the center of the anterior capsule.

In cataract extraction with combined posterior capsulotomy, the expulsion of the lens may be done in the classical manner. Usually, by careful deep stroking of the cornea, the cortex may be quite thoroughly pressed out of the anterior chamber. This step should be done under direct illumination so that the extraneous lens matter will become visible. However, in the case of blood in the aqueous humor, the contents of the anterior chamber become invisible. In case of doubt as to the complete evacuation of the cortex, it would seem to be good surgery to irrigate the anterior chamber.

Lavage of the anterior chamber is particularly indicated after the extraction of soft cataracts, when an undue amount of lens matter is left in the anterior chamber. Gravity irrigation is possibly the safest from the standpoint of gauging the strength of the flow of the solution; though, by exercising care, the irrigation may be performed through a small cannula attached to a two ounce bulb syringe.

In regard to preventing the formation of secondary cataract, all other steps in the operation are subordinate to the opening of the posterior capsule. So far as I can learn no one has taken this step routinely during cataract extractions though Haab, Fox, Knapp, Herbert, and others have stated that this division of the posterior capsule may be performed from ten days to six weeks following the extraction. Casey Wood's rule was that it might be done as soon as the corneal incision had healed sufficiently so that it would not gape from the pressure of the knife.

As a preliminary step to opening the posterior lens capsule, the speculum or lid retractor should be removed. The surgeon should then slightly elevate the upper lid with his thumb, and with a von Graefe cataract knife of large size, make a quick stab in the center of the capsule. In performing this, the knife should be passed flatly through the corneal section. The procedure requires only a moment. Immediately afterward,

the lid is allowed to fall back into place and thus close the corneal section so as to prevent the escape of vitreous.

To secure the best results, the pupil should be moderately dilated with atropin before operation. Pronounced dilatation is contraindicated because the pupillary border then recedes behind the corneal section so the iris is grasped with difficulty. To obtain the desired degree of postoperative dilatation, a one percent atropin solution may be dropped in the eye immediately after extraction. Some of this solution, no doubt, gets into the anterior chamber and thus materially promotes dilatation. Complete postoperative dilatation is a safeguard against the formation of synechiae, the presence of which encourages the formation of secondary cataract.

Unless much cortex has extruded, the toilet of the eye should be made without irrigation. Washing out the culdesac may end perniciously in that infection may reach the wound from the margins of the lids and cilia. Shreds of capsule, cortex, and other particles are more satisfactorily removed from the corneal incision by the use of a small iris repositor than by irrigation. This instrument should be gently slipped backward and forward through the incision with a slicing motion. I frequently finish this step of the operation before the posterior capsule is opened and find that the protrusion forward of vitreous occasioned by the capsulotomy does not disturb the average corneal toilet.

In dressing the eye, the lids should not be smeared with vaseline because vaseline liquefies at body temperature and will run over the margins of the lids, which are never entirely sterile. In this manner it may carry infection into the corneal wound. The dressing should be lightly applied. A thin pad of cotton between two layers of gauze, held in place by strips of adhesive tape, makes a desirable dressing. If the patient is restless, a wire mask or other type of shield may be placed over this.

To summarize; the simplicity of the procedure and the ease with which it is accomplished, together with the almost unfailing favorable results with which it is followed, lead me to conclude that the posterior capsulotomy done immediately after a cataract extraction is a safer, more effective procedure than any type of intracapsular extraction.

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NOTES, CASES, INSTRUMENTS

CASE-HISTORY PHOTOGRAPHS WITH THE MINIATURE CAMERA*

H. F. Pierce, Ph.D.
BALTIMORE

A case history should present, above all, a precise record of carefully made observations. The opinions of the observer and his deductions from the data he has collected, while of immediate importance to him and to his colleagues, may be found erroneous in future years; but the value of a sound observation, carefully recorded, is permanent.

A good photograph may add to the case history an unbiassed record more comprehensive and definite than many paragraphs. Most institutions are provided with the larger and more elaborate forms of apparatus for producing such photographs, equipment which, because of its cost and complexity, the oculist in private practice is likely to do without. It is the purpose of this article to show how the oculist, in the course of his routine examination, may make satisfactory pictures of the anterior segment of the eye easily and inexpensively by the use of a miniature camera and some of the professional equipment already in his office.

The miniature camera has many advantages for this work. The short focal length of its lens (approximately 50 mm.) affords a compact unit which may be mounted, by means of an adapter, on a corneal microscope, or other similar stand and used on the ordinary glass-topped instrument table. The usual headrest, and a hand operating lamp as a source of illumination are auxiliary equipment. The negative (motion picture or slightly larger) film is inexpensive, which warrants the operator in making a number of exposures of an interesting subject. Enlargements of suitable size for mounting on case histories cost little more than ordinary prints. The negatives are small, light, and easily filed.

Any small camera might be employed for this purpose. The one illustrated was chosen because all of the attachments suitable for this method of eye photography were available, and tables for their use had been published by the makers of the camera. It was only necessary to make an adapter for mounting the camera on the base of a

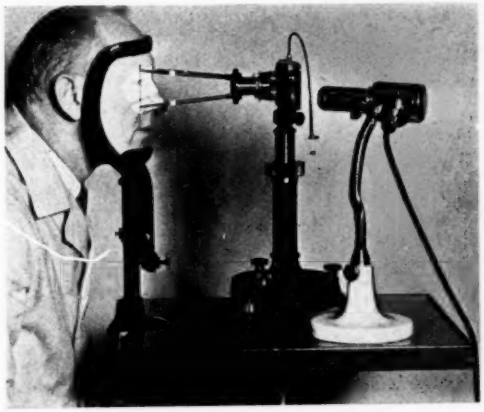

Fig. 1 (Pierce). Miniature camera in use.

corneal microscope, slitlamp, or other similar instrument having a vertical adjustment, to complete the equipment.

Figure I shows the camera in use. The lens is extended by means of a ring inserted between it and the camera. To the front of the lens-mount is attached a quadrupod, the legs of which extend toward the patient's eye. A black thread is stretched across the tips of the two outer legs and cemented to them. The two inner legs are retracted (and the lower one may be removed) so as not to strike the patient's nose. The camera is mounted on a corneal microscope base, replacing the microscope, by means of an inexpensive adapter, the only part of the equipment which had to be made especially. Figure 2 shows, from right to left, the camera, the extension ring, the adapter, the quadrupod with the thread cemented to it. A hand operating

* From the Wilmer Institute of the Johns Hopkins University and Hospital.

lamp furnishes illumination for making the photograph.

Operation of the camera is simple. The headrest is adjusted to the patient's head; by moving the camera about on the table and using the vertical adjustment on the stand, the eye is centered within the rectangle indicated by the legs of the quadrupod; the operator then steps to the side of the headrest and moves the camera toward the patient's eye until the thread is seen projected against the iris—here the operator sights across the thread with one eye only, to avoid confusion; the release is pressed and the photograph has been taken. Like all simple procedures, this is easier to perform than to describe. No other focussing methods or devices are necessary.

With supersensitive panchromatic film the exposure is 1/20 second with the lens stopped down to f-9, using the hand operating lamp for illumination. At this speed there is little trouble from movements of the patient's eye; and with the lens working at an aperture of f-9 there is sufficient depth of focus (approximately 5.6 mm.) to allow for slight errors in adjusting the camera to the proper distance. With slower shutter speeds, larger stops, and one of the color films now on the market, natural color photographs are possible in suitable cases, though color photography is not recommended to the beginner.

Negatives made with the miniature camera should have "fine grain" development, and this should be specified when the films are delivered to the finisher. The size of the picture desired should be specified in terms of diameters: e.g., with the equipment as shown, the eye is photographed exactly one-half its natural size; it is desired to have the case-history picture twice the natural size of the eye; therefore, an enlargement of 4 diameters is specified.

The same equipment, minus the adapter and base, may be used for photographing small objects, such as tumors and pathological specimens.

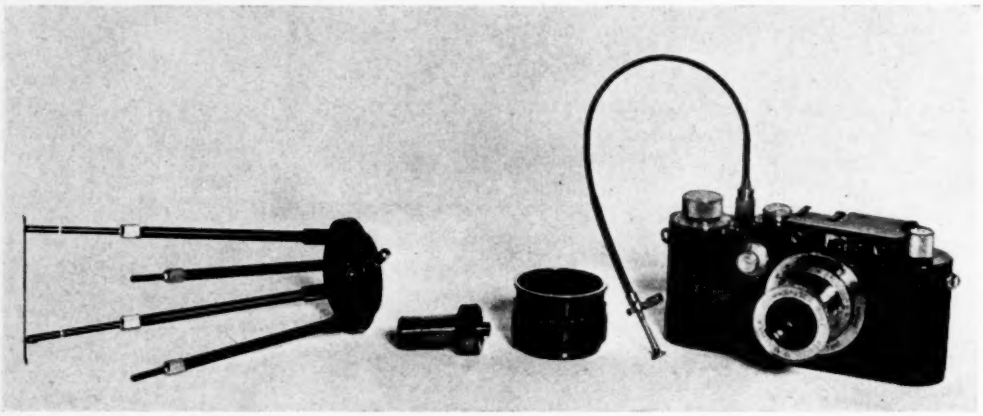

Fig. 2 (Pierce). The disassembled parts of the equipment.

The quadrupod is set upright on the table with its legs extended equally, the specimen is placed within the rectangle bounded by their tips, the camera is placed on the quadrupod pointing downward, and light is furnished by the hand operating lamp or even a desk lamp. In the case of such three-dimensional objects, the lens is stopped down to f-32, and several-seconds exposure is given. However, better results are obtained by fitting the camera with a ground-glass focussing attachment, with which the specimen may be seen exactly as it will appear in the finished print.

With the same camera, an auxiliary front lens, and a longer quadrupod, full-face pictures of patients can be made instantaneously and without

focussing, in the light of one or two photo-flood bulbs. Thus, with simple and easily operated equipment such as has been described, the oculist may provide himself with adequate photographic records of his cases, and add to his histories observations of present and permanent value.

The author's thanks are due E. Leitz, Inc., 60 East 10th Street, New York City, for the loan of the apparatus with which this work was done.

Johns Hopkins Hospital.

A CONJUNCTIVAL FLAP HOLDER FOR CATARACT SUTURES

EUGENE M. BLAKE, M.D., F.A.C.S.
NEW HAVEN, CONNECTICUT

One hesitates to present a new instrument or to suggest a new step in the operation of cataract extraction, but the instrument to be described has served me so well for a number of years that I venture to describe it. The employment of sutures in cataract surgery now seems so well established that a failure to make use of this great addition to our technic is difficult to comprehend. I believe that the failure of some operators to suture the wound is due to the fact that it appears to be a complication and one which imparts an element of danger during the course of the operation. Actually, the application of sutures can be made without risk and proves of real value, especially in the feeling of security which the surgeon later enjoys.

An ideal suture for the cataract operation would be one that could be introduced before the section is made, with the section placed between the two tissue bites of the suture. This is, however, so difficult of performance and the liability of cutting the suture so great that few men can accomplish the feat regularly. On the other hand, if one bite of the suture can be placed before the section is made and the second bite taken easily and quickly at its conclusion, there is no added risk, and a real safeguard has been added. This, I feel, is accomplished by the method to be described, using a metal instrument to protect the incision into the eye and thus prevent the opening of the wound.

The flap holder, as I have called the instrument, is a curved spatula, perforated to allow passage of the needle and suture. The spatula is set upon the handle at an angle of 45°, so that the hand holding the instrument does not obstruct the view. The concavity of the instrument is such that it corresponds to the convexity of a globe of average size. The opening, .66 mm. in diameter, allows the passage of an ordinary conjunctival needle without difficulty. If the opening in the instrument is too large, conjunctiva will be drawn into the hole and difficulty be encountered in drawing the suture through. The instrument can be used for either eye.

Fig. 1 (Blake). Conjunctival flap holder for cataract sutures.*

After the usual preparations are completed for the cataract operation the needle is introduced into the conjunctiva and episcleral tissue, 5 mm. above the limbus in the vertical meridian. The suture is now drawn to one side and the corneal section made, finishing with a small conjunctival flap which ends in front of the suture. The needle is again picked up and its point introduced from the under surface of the conjunctival flap near the limbus. At the point where the tip of the needle pushes up the conjunctiva the flap holder is applied, so that the needle will pass through the opening of the instrument. Gentle pressure of the instrument holds the flap against the sclera and prevents opening of the section into the eye. When the needle point is a few millimeters through the opening, it is grasped by

* This instrument was made by the Geo. Tiemann Co. of New York.

the needle carrier and the suture is drawn through. The instrument is raised and the assistant cuts the suture close to the flap holder, allowing sufficient length for easy tying. The suture is loosely tied and the loop laid to one side so that it in no way interferes with the progress of the operation. At the conclusion of the operation two more sutures are inserted, one on each side of the central suture. The flap holder is not necessary for these lateral sutures as they are introduced from the outer surface of the conjunctiva.

Until the flap holder was employed I was always made uneasy by the gaping of the wound which is necessarily caused by passing a suture from beneath outward. With the holder one gently presses the flap against the sclera, thus preventing the gaping of the wound. If, at any time after the suture is placed one desires to close the wound, the suture is ready to tie and the surgeon is master of the situation. The episcleral bite allows very firm closure of the wound and never comes out until removed.

Although designed for use in cataract surgery, the flap holder is extremely helpful in suturing scleral wounds, where, because of the tough tissue the introduction of sutures always causes the wound to gape. Of even greater value is its use in suturing corneal wounds,

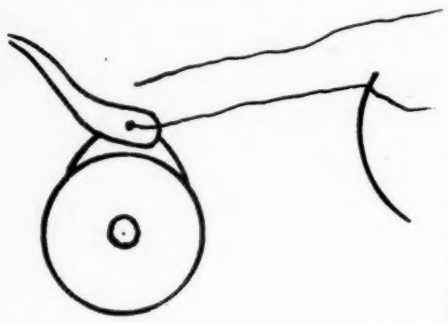

Fig. 2 (Blake). Flap holder in use.

since it obviates the necessity of using forceps to hold the corneal flaps, with inevitable bruising of the tissue, which is so undesirable.

303 Whitney Avenue.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommell Hildreth

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

Section on Ophthalmology

November 10, 1933

Dr. Gordon New, president

Recurrent idiopathic retinal hemorrhages

Dr. Walter E. Camp (Minneapolis) reported the case of a woman, 25 years old, who complained of impaired vision in both eyes. She had first noticed a fogging of the sight in both eyes on December 23, 1932, which gradually cleared. Seven days after this first attack there was a sudden severe recurrence involving especially the left eye.

The first examination of her eyes was made on January 9, 1933, which was about ten days following the onset of the second attack. The vitreous was extremely hazy. The optic discs and surrounding retinae were swollen and edematous. Scattered throughout both retinae were numerous hemorrhages, the largest being visible just below the macula in the left eye. Surrounding both maculae were scattered yellowish-white exudates. The veins had irregular enlargements, and in some areas the blood column could not be seen. Vision in the right eye was 6/10 and in the left eye 6/20.

A complete physical and laboratory examination made at this time was entirely negative except for infected tonsils and a non-specific endocervicitis. Resting in the hospital she was given calcium gluconate and forced elimination with pilocarpine sweats and cathartics. The tonsils were removed and the cervix cauterized. Soon after leaving the hospital she had another severe hemorrhage involving only the left eye. The hemorrhage was large and boat-shaped and was pre-retinal.

Treatment was continued as above and she gradually improved over a period of about five months, so that by June her vision was 6/6 in the right eye and 6/7 in the left. About July 8th she had a severe hemorrhage in the right eye which also involved the vitreous and prevented examination of the fundus. A von Pirquet test was slightly positive but clinical and x-ray examinations showed no evidence of tuberculosis.

Over a period of months the hemorrhage in the right eye absorbed and at present her vision was 6/6. The vision in the left eye was 6/10 and this eye showed beginning retinitis proliferans.

Recently Levitt of Brooklyn reported 30 cases from the Massachusetts Eye and Ear Infirmary. His conclusions were that, aside from trauma, these cases could be divided into two groups. (1) A small group with definite perivascular changes, which were undoubtedly due to tuberculosis. These usually were recurrent, bilateral and occurred more frequently in young females. (2) A larger group having little or no perivascular change; usually having more marked hemorrhage in the vitreous, and occuring at any age. The etiology of this larger group was still undetermined.

Discussion. Dr. Walter Fink said that he understood that Dr. Benedict at one time advocated the use of neosalvarsan in place of tuberculin as it was a somewhat safer procedure and the result equally as good.

Dr. F. E. Burch mentioned the case of a 67-year-old man with petechial hemorrhages of the retina who entered the hospital with a diagnosis of Paget's disease. His head was getting larger, he had lost stature, and besides the general deforming osteitis he had a peculiar bowing of the tibia. There was a definite calcium dyscrasia, and he improved promptly on the administration of calcium gluconate in large doses.

In a similar case, in a man aged 48 years, calcium therapy also controlled the condition. In 1876 Paget described retinal hemorrhages in his first clinical

report of what was now described as Paget's disease, but calcium metabolism was not understood then.

Dr. H. P. Wagener said they were using sodium gold thiosulphate. He felt that a great percentage of these cases were tuberculous.

Dr. W. A. Kennedy said he had been using sodium gold thiosulphate in a similar case for about eight months. He started with 25 mg. and gradually increased the dose to 100 mg. The eyes had not improved much under treatment although the patient claimed that he could see better at times.

Dr. Camp (closing) stated that a blood platelet count had been made twice and was practically normal each time. The blood sugar was normal but a blood calcium determination was not done.

The value of autopsies in the specialties

Dr. J. W. Kernohan (Rochester) (by invitation) gave a talk on this subject. Eight cases were reported in which rather obscure clinical findings were made clear after autopsy study.

Walter E. Camp,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY

November 18, 1933

Dr. Frank Spencer presiding

Traumatic rupture of the choroid between the macula and disc

Dr. R. W. Danielson presented the case of Mr. M. J. U., aged 24 years. On March 24, 1933, while chopping wood a piece of wood struck the right eye. With fluorescein one could see widespread corneal abrasions and small conjunctival and corneal lacerations. The anterior chamber was one-fifth filled with blood. The pupil was widely dilated (before the use of any drug). These anterior segment injuries disappeared within a few days, except the dilated pupil; then one could see a hemorrhage in the region of the macula and a white tear of the choroid down through the macular region. Pigment had migrated into the tear. The vision with and without correction was 4/12, and J. 5. Fields taken one month after the injury were normal both for form and colors; no scotoma could be determined.

Discussion. Dr. Edward Jackson said that the blow seemed to have fallen on the center of the cornea which was not common. He felt that the rigidity of the cornea and the equal distribution of force in all directions explained the limitation of the choroidal rupture to such a small area.

Dr. William H. Crisp asked whether in walled cavities such as the eye, the effect was produced by a wave of action through the intraocular fluids or through the wall of the globe. The tear in the choroid at the posterior pole of the globe was produced by a mechanism very similar to a fracture of the skull by contre-coup.

Dr. C. H. Stine felt that the effects of the tear were more wide-spread; he saw a faint yellowish arcuate line extending for a considerable distance both upward and downward from the main tear.

Dr. Danielson said that the full peripheral field and absence of scotoma could be explained by the fact that free anastomosis of the choroidal vessels saved the surrounding choroid, and by the fact that the retina itself was not involved.

Pseudoretinoblastoma (?)

Dr. R. W. Danielson also presented the case of Julius M., aged 6 years. The child's mother gave the history that the right eye had never looked just right since birth. The pupillary reactions in both eyes were normal. On examination one saw just behind the lens a brownish-gray, smooth, lobulated mass. On its surface there were enlarged blood vessels with small aneurysmal-like areas. Transillumination indicated quite definitely that there was fluid behind this mass, which was probably a detached retina. A week prior to presentation the child was struck on the bridge of the nose. This was followed by an attack of glaucoma which was now yielding promptly to treatment. Physical examination and diagnostic tuberculin tests were negative.

Discussion. Dr. W. H. Crisp stated that he had studied this case several times four or five months previously with Dr. Danielson and felt that the condition was not a retinoblastoma. It was his opinion that there was possibly a congenital vascular anomaly which resulted in the production of cicatricial bands and a complete retinal detachment. There had not been, to his knowledge, any elevation of the intraocular tension during the course of his observation. Delay in enucleation was not hazardous.

Dr. Edward Jackson was of the opinion that in all probability this was a case of retinoblastoma, and that subsequent developments in the case might establish this diagnosis.

Complete radial iridectomy in cataract extraction

Dr. R. W. Danielson also presented the case of Mr. G. L. L., aged 60 years, on whom he had performed a bilateral combined intracapsular cataract extraction. The usual operative procedure was carried out with the exception of the manner of treatment of the iris. A radial cut in the vertical direction from the upper pupillary border to the root of the iris was made with the de Wecker scissors. This was done to facilitate delivery of the lens and yet to have a small, sightly coloboma with a movable pupil. At the time of presentation the coloboma was about three to four millimeters wide. Final vision with correction was, O.D. 20/20 —5, and O.S. 20/25+.

Discussion. Dr. G. H. Stine stated that he had been able to obtain a coloboma as narrow as the one in this case by the usual method of iridectomy, the scissors being laid astride the wound at the limbus in the vertical direction rather than parallel with the limbus. In cases where full mydriasis could be obtained with drugs, a peripheral iridectomy leaving the sphincter intact was rather to be desired in the final result.

Implantation cyst of the anterior chamber following injury to the cornea

Dr. M. E. Marcove presented Mr. C. S., aged 22 years, a highway constructor, who on May 28, 1933, was struck in the left eye with a stone. The vision was immediately lost. The patient was treated in another city by suturing the globe. Seven days later the patient came to Denver to consult another oculist. At that time the eye became painful. The patient had had a primary sore in July and had been under antiluetic treatment since August, otherwise the general health was good. When first seen by Dr. Marcove the vision was, O.D. 20/20; O.S. counting fingers at one foot. Examination of the right eye was essentially negative. In the left eye there was a horizontal scar in the cornea extending from "4 to 7 o'clock," the scar being more prominent on the temporal side. The rest of the cornea was normal. Extending into the anterior chamber from the temporal half of the scar there was a large, freely movable cyst measuring 3 x 3 mm. On the temporal side and below, there were several spots of bright blood which had remained about the same size since the patient was first seen in September. The lens was clear. Below and temporally from the disc and including the macula there was a large area of chorioretinitis juxta papillaris of Jensen. Tension had never been found above normal. The treatment consisted of the use of atropin, hot compresses, dionin and antiluetic treatment. Dr. Marcove was not certain whether the cyst was epithelial or endothelial. He had not considered any operative interference at the present time unless glaucoma supervened. Aspiration of the cyst might be attempted.

Discussion. Dr. W. H. Crisp said that opening of the anterior chamber might allow the gush of aqueous to carry the cyst out into the wound.

Dr. J. M. Shields cited the case of a small boy who had received a perforating injury of the cornea at the limbus, due to running into a barbed wire fence. The pupil was irregular and resisted eserin myosis. There were two or three cysts in the anterior chamber. The cysts were removed by iridectomy.

Perforating injury of the cornea

Dr. F. R. Spencer presented the case of Master L. C., aged 5 years, first seen

in May, 1932, with the history that he had struck himself in the right eye with an iron rod about three hours before the visit. Examination showed a linear, horizontal wound of the cornea with prolapsed iris. The child was immediately sent to the hospital where the prolapsed iris was excised and the wound covered with conjunctival flaps. Protargol and atropin were used. The stitches were removed a few days later. At the time of presentation the vision was, O.D. 6/30 +1 and J. 7; O.S. 6/6 —2 and J. 3. There was a narrow linear corneal scar across the central cornea, to the central portion of which a narrow tag of conjunctiva was still attached; the remainder of the cornea was clear. The lower pupillary portion of the iris was adherent to the wound forming an anterior synechia. The eye was quiet, and there was no elevation of tension. The question of any operative interference to break the anterior synechia was raised.

Discussion. Dr. W. H. Crisp stated that most cases of this nature might go on for many years without trouble. There was some danger of reformation of the synechia after severance, although atropin mydriasis might prevent this complication.

Severe dermatitis and conjunctivitis due to "Lashlure"

Dr. G. H. Hopkins reported the case of Miss J. L., aged 46 years, a school teacher. She was first seen on November 13, 1933, with the complaint of swelling lids, moderate itching of the eyes and very slight watery discharge, which developed two days after dying her eyelashes and eyebrows with a preparation called "Lashlure." Examination revealed moderate edema of the upper lids and conjunctiva. The corneas were clear, and the fundi were normal in both eyes. During the following week there was a gradual increase in all symptoms to the extent that hospitalization was necessary. The swelling of the lids and the chemosis of the conjunctiva had increased to such an extent that the lids could be separated only with great difficulty. The free use of boric acid irrigations and cold packs and boric acid ointment had little effect; opiates at night were necessary to relieve the symptoms of intense burning. All treatment tended to produce a profuse stringy mucous discharge, and the instillation of even normal saline increased the pain and burning of the conjunctiva. Conjunctival smears were negative for bacteria. The blood picture was that of a slight anemia. During the second week of treatment the condition gradually subsided, although, when the edema of the lids and the chemosis of the conjunctiva decreased enough to permit a more careful examination of the central portion of the cornea, there was noted a slight infiltration of the central portion of the cornea of each eye. There was a marked general edema of the corneal epithelium, which gradually subsided along with the other symptoms. At the time the case was reported there remained a slight injection of the conjunctiva and a slight dermatitis of the skin of the lids and brows. In the third week there developed a very marked and painful swelling of the glands of each side of the neck, accompanied by a general rash all over the body and intense itching of the skin. These general symptoms had nearly disappeared. The case was still under observation.

Discussion. Dr. G. H. Stine cited a similar case reported by Greenbaum in the Journal of the American Medical Association, July 29th issue, in which removal of the eyelashes with a pair of scissors as close to the lid margins as possible was followed by marked improvement within forty-eight hours, and from then on complete relief.

George H. Stine,
Recorder.

ILLINOIS EYE AND EAR INFIRMARY

November 8, 1933

Dr. Harry S. Gradle presiding

Orthoptic clinic

Dr. J. L. Bressler presented a group of children from the orthoptic clinic which was started about the middle of September. The results so far had been

satisfactory. The children were very cooperative, and it was hoped that all squint cases would be referred to this service to see what could be accomplished without surgery. Treatments were given once a week, and most of the children had developed fusion and overcome suppression of one eye after three or four treatments.

Discussion. Dr. Thomas D. Allen said that in the Transactions of the British Ophthalmological Society for 1931, there were several interesting articles on this subject. Miss Maddox spoke of the remarkably good results obtained. Fusion was being developed in spite of the fact that treatment often was not started until the age of 15 to 20 years.

Rupture of iris

Dr. Adamski presented an 8-year-old girl who was injured on July Fourth by the explosion of a torpedo. When seen one hour later vision was light perception only; tension was normal. A superficial abrasion of the cornea and traumatic rupture of the iris from "11 to 4 o'clock" was seen in the right eye, the iris being torn from its attachment. There was hemorrhage into the anterior chamber. The fundus could not be seen. X-ray showed no foreign body. The patient developed fever associated with a sore throat.

On July 21st Dr. Allen operated, making a subconjunctival puncture of the limbus with a Graefe knife, entering at "12 o'clock" and coming out at "3 o'clock." He attempted to grasp the root of the iris at each place and pull it into the wound, where a fine silk suture was placed in it and then both ends of the suture carried through the conjunctiva for anchorage. The suturing at "12 o'clock" was performed in such a bloody field that it was found the whole of the iris had been grasped. The patient became so restless that further operation was deferred.

On July 28th a small keratome incision was carried subconjunctivally into the anterior chamber at "3 o'clock." No hemorrhage of any consequence occurred. The root of the iris was grasped and a fine silk suture was carried through it and then through the conjunctiva. This was more successful than the first attempt. The end result was an appearance somewhat like that of an iridencleisis. Two similar cases were reported by Key in the Archives of Ophthalmology, May, 1932.

Glaucoma

Dr. Thomas D. Allen presented a woman who had a history of gradual loss of vision over a period of about a year, with some tenderness in the vicinity of the right eye. At Billings Hospital she had been told that she had glaucoma. Vision of the right eye was light perception; tension 65 mm. The pupil was large, and iris was slightly atrophic. There were large tortuous vessels leading from the limbus to the conjunctiva. The anterior chamber was shallow. Miotics did not diminish the tension. There was a mature cataract. In the left eye the tension was 34 mm.; the anterior chamber shallow, but apparently no lenticular opacity. Form fields were normal and there was no change in the disc.

An iridectomy was done on the right eye to reduce the tension, but failed to change it materially, and since then the tension had been about 44 mm. Transillumination had repeatedly been negative, but in spite of this there was a question of a new growth. The problem was whether it was safe to leave the eye alone or whether it should be enucleated. Apparently there was no glaucoma in the left eye. The tension had not been high since the first visit, between 16 mm. and 22 mm., even following homatropine instillations. Many similar cases in which the eye was not removed apparently got along all right.

There was also a question as to the justifiability of removing the cataract to allow for more perfect study of the fundus for a new growth and also removal of the lens might aid in the control of the hypertension. Of course no visual improvement could be expected.

Discussion. Dr. D. C. Orcutt said that in many such cases it was better to retain the eye for the patient's peace of mind. Some authorities stated that a blind eye should be enucleated, but with this opinion he did not agree. In one pa-

tient, operated on fifteen years ago, the tension had never risen, though the eye was totally blind. The lens in a glaucomatous eye was very easily removed, without hemorrhage or other complications.

Retinal pigmentary degeneration

Dr. Leo L. Mayer presented a 68-year-old man whose history was that thirty years ago, in a steamboat accident, he was knocked unconscious. Afterward it was thought that the vision was impaired. He went to a chiropractor who manipulated the spine. In time some of the vision returned. Vision at this time with correction was O.D. 20/50, O.S. 20/100. Tension was normal. Visual fields were contracted concentrically to about 20 degrees in the right eye and to 15 degrees in the left eye. There was marked pigmentary degeneration of the retina, not of the bone corpuscle type, and a waxy pallor of the discs. Night blindness was very marked.

Tubercle of the choroid

Dr. V. M. Leech presented a young girl, first seen in July, at which time a tentative diagnosis was made of tubercle of the choroid of the right eye between the macula and the disc. The lesion was quite fresh and presented the characteristic dirty gray appearance. The Mantoux test was negative. Nothing was found of interest on physical examination. X-rays of the chest were negative. The lesion was now comparatively healed. There was a small defect in the left fundus at the nasal periphery, which looked quite old, and had probably existed since early childhood.

The treatment had been general, consisting of ultraviolet irradiations twice a week, tonics of codliver oil, selected diet, and outdoor exercise. No tuberculin injections were given. The Wassermann blood test was negative. The proximity to the disc, the color and elevation, all pointed to the diagnosis. In choroiditis caused by focal infection the elevation of the lesion would not be present.

Cataract in hydrocephalus

Dr. V. M. Leech presented a 77-year-old woman, weighing 95 pounds, whose case was of general as well as of ophthalmological interest. It was thought that she had Paget's diseases on account of the enlargement of the cranium and the marked curvature of the dorsal vertebrae. X-rays however did not show any elongation of the long bones nor softening of the compact layers. There was a history of brain fever in childhood, so a diagnosis of hydrocephalus was made. She also had chronic periarticular arthritis. Apparently these conditions proved no contra-indication to cataract operation, because this was done two and a half weeks ago with satisfactory results.

Aneurysm within the orbit

Dr. Adamski showed a 25-year-old man who was in an automobile accident in 1930, sustaining a skull fracture which extended to the margin of the frontal bone, and was unconscious for about two weeks. There was a swelling about the size of a lemon over the left eye, which had remained ever since. The right pupil reacted to light and accommodation; the left did not; the left upper lid drooped.

On September 27th a vertical incision was made at the inner canthus, and the larger vessels were tied. On November 1 an incision was made in the region of the eyebrow; about an inch and a half section was made until the orbital fascia was exposed, and a pulsating aneurysmal swelling was exposed. The upper portion of the sac was tied off on each side. The space between was seen to be lined with smooth white tissue. There was still some swelling, but none of the vessels were palpable. It seemed that the condition was one of large aneurysm of the ophthalmic branch in the orbit, which was also pushing out the eyeball.

Dr. Orcutt said that the reason for ligating in this manner was on account of the great danger of anemia in ligation of the internal carotid. It was safer to begin in this way, and possibly later

the internal carotid could be ligated without trouble.

Robert von der Heydt,
Recorder.

BUFFALO OPHTHALMOLOGICAL SOCIETY

November 9, 1933

Dr. H. H. Glosser presiding

Modern treatment of syphilis as related to eye conditions

Dr. Earl D. Osborne read a paper on this subject in which he divided syphilis involving the eye into four groups.

1. Early syphilis, including chancer of the eyelids and conjunctivae; mucous patches of the conjunctivae; iritis, and other manifestations of early syphilis of the uveal tract. These manifestations of syphilis improved promptly under combined arsphenamine and bismuth therapy.

2. Late syphilis, including iritis, iridocyclitis, choroiditis, retinitis, neuritis, and interstitial keratitis of acquired syphilis. The latter condition was not nearly so rare as many authors had stated. He had seen three cases in the past year and this condition was important from the standpoint of workmen's compensation. Late syphilis of the eye should be treated with combined arsphenamine and bismuth therapy at intervals of approximately four months between courses of arsphenamine with bismuth during the interim. Interstitial keratitis from acquired syphilis, usually responded more rapidly than did the congenital form. Any resistant case of late syphilis should be subjected to fever therapy without hesitation.

3. Congenital syphilis of the eye, including interstitial keratitis and the same conditions mentioned in group 2. During the past eight years not a single case of interstitial keratitis had failed to improve after the combined use of sulpharsphenamine and bismuth intramuscularly, with repeated courses of arsphenamine. It was important that treatment should be combined and that it be carried to the limit of tolerance. Fever therapy, either in the form of malaria or produced by the split dose method of typhoid vaccine intravenously, materially shortened the duration of the attack. Persistent, continuous treatment had prevented recurrence and the involvement of normal eyes.

4. Neurosyphilis with eye manifestations, including optic atrophy, neuritis and retinitis. These patients were given one strenuous course of combined arsphenamine and bismuth followed by fever therapy. The results were incomparably better than with arsphenamine and bismuth alone or combined with Swift-Ellis intraspinal therapy.

Blood staining of the cornea

Dr. E. E. Blaauw presented a girl seven years of age, who was seen by him four days after being struck in the right eye with a stone. There was the usual picture of hemophthalmia clouded by a dark opaque cornea. The blood could be made out in the anterior chamber faintly around the limbus. At this time the girl was fretful, had vomiting spells and the intraocular tension was +2 (tactile). The condition did not improve and a week later a paracentesis was done. Marked improvement in her physical condition resulted. Intraocular tension remained normal. Shortly after the paracentesis, the cornea assumed an olive green color and was too dense to allow inspection of the deeper portions. At the present time it seemed as if some clearing was beginning in the center, which was contrary to the usual course. The individual's clotting time was within normal limits.

Microscopically two substances had been found in the cornea in such conditions. One, a strongly reflecting, sharply defined substance which was also found by Leber in a case of aspergillus keratitis. An inflammation in Leber's case and a hemorrhage in Baumgarten's case produced conditions which gave rise to a fibrogenous substance that penetrated the corneal parenchyma. It was also found after sectioning of both the long and some of the short ciliary arteries, as well as after tying off the

vena vorticosae. Hemosiderosis was a diffuse iron reaction which in this case involved the cornea, manifested by a deposition of granular hemosiderin in the corneal cells and their extensions. This iron containing fluid apparently penetrated by diffusion and the precipitation in an insoluble form took place in the corneal tissue itself.

Ivan J. Koenig,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY

November 20, 1933

Dr. Dwight C. Orcutt, president

Papillomatosis of the conjunctiva

Dr. Philip A. Halper presented a colored boy, four years old, who, at the age of 18 months, had injured his right eye with the point of a pencil. About three months later redness and irritation were still present in the eye, and a papilloma had developed in the region of the caruncle. About seven months ago papillomatosis developed in the conjunctival sac. Serologic and bacteriologic studies were negative. Sections of one of the tumor masses showed simple papilloma. After removal with scissors the tumors came back more numerous than before and were now also in the upper lid. Radium would be used after a second removal. It was possible that the papillomatosis was a foreign body reaction to pencil particles.

Fusion following extraction of one lens

Dr. Sanford Gifford presented a patient with one aphakic eye following the removal of traumatic cataract. There was high astigmatism, but with correction the vision was 20/15. With glasses stereoscopic vision was obtained. A lens that reduced the image of the right eye and enlarged that of the left eye was used. The lenses were a modification of the distal glass of Zeiss, using the opposite principle for the right eye and the regular principle for the left eye.

Paresis following alcohol injection at the foramen rotundum

Dr. Carmody said that the patient had been referred with a diagnosis of metastatic carcinomatous involvement of the trigeminal nerve. Because of pain, the foramen rotundum region was injected with alcohol giving immediate relief from pain, but accompanied by a loss of external and upward rotation of the eye. Later keratitis developed. Partial closure of the lids by tarsorraphy corrected this.

Orthoptic training in strabismus

Dr. George Guibor presented two children. The first girl had a right convergent deviation of 12 degrees without glasses, and 6 degrees with glasses. She wore: O.D. +2.25 D. sph. ⊂⊃ +2.00 cyl. ax. 120°, vision = 20/50—1; O.S. +2.00 D. sph. ⊂⊃ +1.00 cyl. ax. 100°, vision = 20/50—1. Fusion training over eight months had improved the vision to O.D. 20/25—1, O.S. 20/30+1, with correction, and the Maddox rod test disclosed 2 degrees of esophoria for far and near. Adduction was 12 degrees; abduction was 20 degrees.

The second girl, 11 years of age, had had a left convergent deviation between 5 degrees and 10 degrees, without glasses, for four years previous to entering the clinic. Vision O.D. +6.50 D. sph. ⊂⊃ +1.00 cyl. ax. 75° = 20/30; O.S. +6.75 D. sph. ⊂⊃ +6.75 cyl. ax. 105° = 20/200—1. Under training since last June, the vision had improved to O.D. 20/25, O.S. 20/65. Cover tests showed less than 5 degrees of esophoria without glasses. Adduction was 4 degrees; abduction 6 degrees. Both cases had excellent fusion and fusion amplitude in the stereoscope.

Autogenous-blood instillations of the anterior chamber

Dr. Beulah Cushman said that a diagnosis of right tuberculous uveitis had been made in this girl at the age of 10 years, in November, 1930. She was treated with tuberculin with great benefit to her general health and the relief of headaches which were the most distressing symptoms but there remained

a low grade uveitis and gradual reduction in vision from 1.0 to 0.5. Again in April, 1932, after a complete examination the same diagnosis was made. The tuberculin test was positive in a 1/10 dilution, and again the headaches were relieved with the use of tuberculin, but the uveitis remained active with 30 to 50 fresh and old posterior precipitates on the cornea, increased density of aqueous and cellular infiltration of the anterior vitreous. The tension was normal.

On March 25, 1933, vision of the right eye was 0.5. Then the first auto-blood-anterior-chamber instillation was made according to the method used by Schieck. The change in the eye on the second day was remarkable. The blood had disappeared and the precipitates had almost entirely vanished. The eye continued to improve. After five weeks there was an activity again, the instillation was repeated, and then again every two weeks until she had had five, the last one on June 17. Since that time there had been no activity and the vision had improved to 0.8. She had had no tuberculin since the instillations of blood, and her general treatment had remained the same.

Progressive exophthalmos in thyroid disease, with report of a malignant case

Dr. Michael Goldenburg read a paper on this subject which will be published in the American Journal of Ophthalmology.

Discussion. Dr. Harry Woodruff said that he had observed two cases of progressive exophthalmos for a year following operation for goitre, one of them so extreme that ulceration had commenced in the cornea of one eye. Both cases were benefited by the use of physostigmine internally.

Dr. Goldenburg (closing) said, in answer to Dr. Katz, that so far as he knew his idea of a chemical analysis of the orbital fat was original. It was quite probable that the thyroid in these cases might not be as important as the other endocrine organs. The results obtained from physostigmine were probably due to its effect on the capillaries of the other endocrine organs as well as the thyroid.

Recurrent iridocyclitis accompanied by hypopyon

Dr. Robert Blue read a paper on this subject.

Discussion. Dr. Sanford Gifford said that it was rare to see hypopyon a feature of chronic uveitis, though it was not infrequent in iritis due to focal infection or gonorrhea. It was hard to say whether this iritis with hypopyon was a clinical entity or a severe case of uveitis.

Dr. E. V. L. Brown said that Urbanek reported several cases of recurrent hypopyon in iritis in his 1929 monograph, and made it the subject of a special paper in the Zeitschrift f. Augenheilkunde, Vol. 79, 1932. In all of these he considered tuberculosis to be the cause of the iritis, and Dr. Brown agreed with Urbanek's general observation that recurrences in iritis extending over years were more often due to tuberculosis than to focal infection.

Kinetic velonoscopy or flicker test

Dr. Palmer Good read a paper on this subject which will be published in the American Journal of Ophthalmology.

Discussion. Dr. Leo Mayer suggested that Dr. Good avoid referring to this method as the flicker test. In the optical physiology laboratory where one dealt with the reaction of the retina to rapid succession of light stimuli, there occurred a period where these stimuli were unrecognized as separate. This point was called the critical frequency of flicker and the connotation had been in use for many years.

Dr. Palmer Good (closing) said in reply to Dr. Allen that he had given no case histories; first because he did not think they would prove anything so far as the theoretical proof of velonoscopy was concerned; second, because patients were not tested with velonoscopy alone. Retinoscopy and velonoscopy were always checked one against the other.

Robert von der Heydt

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COLOBOMAS IN THE EYE

Coloboma due to defective development in the eye is most frequent in the iris, where Bartholinus first reported it in 1673. Sometimes the mother recognizes it, and brings the child because the eye does not look right. Coloboma of the choroid can scarcely escape the attention of the student who has begun to use the ophthalmoscope. It had been recorded by von Ammon in 1831. Coloboma of the lens, seen as a notch in its margin, will attract the attention of the ophthalmoscopist who has learned to recognize the dark curved line that marks the edge of the lens, when this is exposed in the extended pupil. It was observed by Knapp in 1862.

The general frequency of these congenital anomalies has been shown by statistical studies but the etiology of such defects has remained a subject of debate and speculation. The location of these defects has been most frequently downward, or downward and slightly to the nasal side. A defect in this direction has been called "typical," and other directions "atypical." Since the embryologic development of the eye has been studied, and the foetal cleft of the secondary optic vesicle recognized as a constant step in that development, its location being downward and slightly inward, it has been common to think of these colobomas as due to incomplete closures of the cleft. This explanation was quite plausible for typical colobomas, but did not fit the large number called atypical and the explanation that sometimes the foetal cleft took other directions has been quite discredited.

The cleft admits to the interior of the secondary optic vesicle the mesoblastic tissue, in which develops the central retinal vessels, and the temporary vessels of the vitreous and vascular capsule of the lens. But the cleft normally has closed before the iris has begun to push out from the ring of mesoblastic tissue from which iris and true corneal tissue develop. Even when colobomas of iris

and choroid are both present and conform to the position of the cleft, there is usually no coloboma of the ciliary body between them, and the choroidal coloboma generally does not extend forward to the anterior margin of the choroid. The few cases of macular coloboma also cannot be considered as in any way connected with the cleft of the optic vesicle. The few cases of coloboma of the optic nerve might, with more probability, be thought of as connected with incomplete closure of the foetal cleft.

At the Section of Ophthalmology of the Royal Society of Medicine, November 10, 1933, Miss Ida Mann showed six cases of coloboma of the iris associated with other congenital anomalies that seem to throw new light on the origin of such congenital defects. In three cases the position of the coloboma was atypical. In presenting two cases of bridge coloboma of the iris to the Ophthalmological Society of the United Kingdom, in 1906, Treacher Collins pointed out that such defect might depend on absence of one of the radial vessels of the temporary vascular capsule of the lens; and that such a bridge of iris was usually situated where the pupillary membrane would be attached to the front of the iris.

In one case shown by Miss Mann there was complete coloboma of the iris with defect in the suspensory ligament of the lens, and lamellar opacity of the lens on the anterior and posterior layers of the foetal nucleus. There was also a row of pigment spots running from each opacity to the equator of the lens and an attachment of the iris to the lens from the anterior surface where the pupillary membrane would normally be attached. Miss Mann pointed out:

"(1) The persisting vessel can occur in any situation round the equator of the lens. (2) There is always a gap or notch in either the ectodermal or the mesodermal portion, or both, of the iris. (3) Evidences of persistent pupillary membrane will also be found, either as tags from the lesser circle or as pigment spots on the anterior lens capsule. (4) If the zonule can be seen there will be a gap in it. (5) There is usually, but not always, a notch in the margin of the lens. (6) There is often, but not always, an opacity in the lens, localized to the region of the coloboma. (7) The persisting vessel can sometimes be actually seen, but more often it has atrophied after having produced the various abnormalities."

These suggestions of the connection of these associated anomalies with the vessels upon which the developing structures have to depend, apply for atypical colobomas, as well as the typical, but do not contradict what may apply to the latter. It brings out hypothetical explanation of colobomas closer to the observed facts, without closing the door to a still fuller understanding of colobomas, when other pertinent and suggestive observations are available.

Edward Jackson.

SENILITY AND THE EYE

Just as mysterious and inexorable as life itself are some of its individual processes. Free will, pious resolutions, or the efforts of earnest and well meaning parents or educators have little part in determining whether an imbecile child can be developed into an adult of normal morality or intellect. Whatever may be thought of the solubility of the general cancer problem, it seems quite certain that the occurrence of some malignant growths is determined before birth by aberration in cell development. In a broader sense, the same inevitable character is associated with those subtle changes which from the very dawn of life lead to decline and death.

The mythical reports of extreme longevity in our forbears can hardly be supposed to have any foundation in fact; and even the occasional newspaper reports as to Indians or other uneducated persons who have attained ages around a hundred and twenty-five years must be regarded with a good deal of incredulity. While some are disposed to think that the span of human life may be indefinitely prolonged, it is much more probable that there is a fairly precise average physiologic limit beyond which all the advances of medicine and hygiene will fail to carry us.

William Osler suggested that in prosperity our equanimity was chiefly exercised in enabling us to bear with composure the misfortunes of our neighbors. It is not unusual to feel with regard to others that old age must be accepted as natural and normal, but with regard to ourselves either that it may be postponed indefinitely or that it is a bitter fate which we are called upon to lament and resist.

It is the part of common sense, and one of the rewards of the biologic viewpoint, to acquiesce in the inevitable, to "seize the passing moments as they fly," and to spend as little time and energy as possible in emulating a certain notorious advocate of gland transplantation whose progress toward senility is perhaps most clearly indicated by his amatory episodes.

Senility and death begin at birth, or rather in the early stages of embryonic development. The vascular system, which has so obvious a share in the aging process, is constantly in course of modification, and each step in such modification may logically be considered as a move in the inevitable march from conception toward death.

Oliver Wendell Holmes's imaginary "one-hoss shay," so well made in all its parts, fell to pieces "all together and nothing first;" but such unanimity in disintegration is never encountered in the human organism. Every corpse is buried with many parts apparently little the worse for wear. Such a waste of good material, because the arteries of the brain, or the blood supply of the heart, or the resistance of the lungs to infection would hold out no longer!

The tissues of the eye illustrate beautifully this tendency to unequal aging as between different parts of the body. Use of the slitlamp has demonstrated that the first traces of the change which we know as "senile arc of the cornea" are to be found in the years of adolescence. But the development of arcus senilis in one eye may considerably antedate that in the opposite eye.

The extent to which changes commonly regarded as senile are really due to infection or other extraneous influence may often be in doubt. Thus degeneration of the arterial system is in many cases clearly associated with syphilis, tuberculosis, or alcoholism, or is at least aggravated by infection. On the other hand there are cases of vascular disease for which no satisfactory cause can be assigned, especially the condition which is commonly referred to as "essential hypertension."

It is well understood that vascular hypertension, with sclerosis and inelasticity of the vessel walls, may affect one part of the body in measure beyond that found elsewhere. Thus the brain or the heart may be the seat of predilection. If evidences of advanced change are found in the retinal circulation, it is correct to assume that the brain is in danger of a catastrophe, although it is not entirely permissible to accept absence of retinal arteriosclerosis as proving that the cerebral circulation is sound.

In analogy with these inequalities of circulatory change we may think of the lens changes commonly regarded as more or less dependent upon senility. In minor degree such changes may as a matter of fact be found in a large proportion of elderly subjects who will never suffer important loss of visual acuity. We are reminded by Schieck (Münchener medizinische Wochenschrift, 1934, eighty-first year, page 85) that the slitlamp has disclosed the presence of some departures from normal structure in most human lenses by the age of forty years; and in twenty-five percent of all cases Vogt found after the age of twenty years a peculiar opacity which he calls "coronary cataract."

The development of presbyopia, ordinarily thought of as a senile process, takes origin in the very nature of the growth of the crystalline lens from fetal life onward. The part of the lens first laid down is less accessible to the nutrient fluids of the eye and is therefore more subject to degenerative change. Judged by his range of accommodation from year to year, the child shows steady progress toward senility.

In certain families the tendency to premature senility of special structures is hereditary. Loss or premature graying of the hair is an excellent example

of this, although not associated with reduced expectation of longevity. In like fashion premature inelasticity of the crystalline lens (another epidermal appendage) may be an isolated peculiarity of families or individuals, and may not justify a bad prognosis as to ocular or general health.

It is possible that essential vascular hypertension will ultimately be accepted as representing hereditary predisposition to senescence of the vascular system—a predisposition established long before birth and therefore in no significant degree susceptible to prevention or treatment.

As favoring perhaps the more optimistic belief that many of the so-called senile changes are to be classed among diseases as distinguished from degenerations, one may mention the fact that some very old people have remarkably elastic blood vessels, and that even after the age of eighty years the cornea may fail to show an arcus senilis.

W. H. Crisp.

RADIANT ENERGY IN OPHTHALMIC THERAPY

Elsewhere in this issue of the Journal appears a review of Mr. Frank Law's monograph on the subject of radiant energy in ophthalmology (p. 547). It is a report of clinical experience and is highly interesting and instructive. Deductions from therapeutic results are for many reasons often fallacious; chiefly because of the unknown factors in each case working for or against recovery and secondarily because of the prejudice of the best intentioned observer. On the other hand equally inaccurate are the so-called scientific laboratory tests because they often fail to imitate clinical conditions accurately. Given the choice between the two there is little doubt that the practitioner would prefer to rely on the opinion of his clinical confrère than on that of the laboratory technician. Hence the practicing ophthalmologist will read this report with particular interest as it will indicate what he may expect in cases of his own in which he contemplates the use of some form of radiant energy.

In discussing ultraviolet light, the author believes that local therapy is more important than general therapy though the latter has its place; a point of view now usually accepted. In treatment of corneal ulcers (except Mooren's) superficial keratitis (especially neuroparalytic and phlyctenular) recurrent abrasions and conjunctivitis his experiences confirm the good reports of other writers. Irradiation to reduce established scars is useless.

An interesting quotation referring to ultraviolet light is ". . . in local therapy we have more than an adjunct to routine ophthalmic treatments, in selected cases it is the treatment of choice; and in many cases results of its use are dramatic." Its use is particularly indicated in persistent superficial lesions and in these indeed the results are often "dramatic" where multiple types of treatment have proved ineffectual.

The field for ultraviolet therapy is limited but as the clinician's experience in the use of this form of treatment increases he becomes more convinced of its value for selected cases. In therapeutic doses it is a stimulant, not a bactericide so nothing can be expected in infected ulcers and similar lesions, unless other therapy is added; nor does it have proved value in deep lesions because penetration in suitable dosage is limited. These and other facts must be known by those who would have success with this form of energy, but when these limitations have once been learned the good results will prove surprisingly numerous.

When considering a new therapy one should not be discouraged by unfavorable laboratory reports because the laboratory doesn't represent life and a rabbit isn't a patient. If one really wants truly to evaluate a treatment let him try its effect on actual cases.

During seve· years radium had been used in about one hundred cases; of these, forty-nine were cases of vernal catarrh, eight of Mooren's ulcer, twenty of external malignant growths. The vernal cases were rather helped than cured; the Mooren's ulcers were "improved" and the treatment of the superficial malignancies was in general satisfactory.

"Infrared radiation serves no therapeutic purpose in ophthalmic disorders." So writes the author. The writer would agree if infrared is considered as a specific ray but as a means of carrying heat to the eye it is certainly a most satisfactory method and often is very valuable in relieving deep aching.

Lawrence T. Post.

BOOK NOTICES

External diseases of the eye. By Donald T. Atkinson, M.D. 704 pages. 479 engravings. Published by Lea and Febiger, Philadelphia, 1934. Cloth. Price $7.50.

The author states in his introduction that he decided to write this book primarily because no work of a similar nature had appeared recently in the English language and secondly because diseases of the anterior segment are more frequently seen than others and can be diagnosed without expensive instruments which are difficult to handle.

The illustrations are mostly photographs of actual cases though there are many of wax models constructed by the author. The illustrations are unusual and excellent, their clarity being helped by the good quality of paper used in the book.

Chapter I is devoted to historical matters; Chapter II to diseases of the eyelids; the last forty-two pages to surgery. Chapter III describes diseases of the lacrimal apparatus and IV the diseases of the orbit. Chapter V is of conjunctival conditions and VI corneal; VII scleral; VIII iritic. Chapter IX is devoted to the ciliary body; X to glaucoma; XI to the lens; XII to the extraocular muscles; XIII to hygiene; XIV to history taking and case records, and XV to remedies used in external diseases.

Many of the recent advances in ophthalmology are included in the text. Most of the subjects included are well covered. A possible criticism is that the variety of therapy suggested is occasionally too limited and some important methods of treatment have been omitted. There is a good index.

It is very difficult to evaluate a new text book but apparently Dr. Atkinson has added a volume of real merit. The book is beautifully bound and printed.

Lawrence T. Post.

Thérapeutique homœopathique en ophthalmologie (Homeopathic therapeutics in ophthalmology). By D. Parenteau. 350 pages, no illustrations, paper covers, price 40 francs. 1934, G. Doin and Cie, Paris.

A book of this character startles the reviewer by its very existence. Evidently the Ark is not so very far behind us. What could be said favorably of a volume which undertakes to expound the indications and "modalities" of atropin sulphate as a treatment for chronic simple glaucoma, and pretends to recite cases of this disease which were cured by use of the mydriatic? When the author employs salicylate of eserin to reduce tension, he does so in the strength of one part of the eserin salt to ten or twenty thousand parts of distilled water. Under interstitial keratitis the use of atropin is not mentioned at all. Another drug used for simple glaucoma is cocaine. Cataract is repeatedly cured with magnesia, secale, bryony; atropin sulphate "in high dilutions" is to be used for corneal ulceration accompanied by hypertension. Dacryocele is cured with lachesis, silicea, corrosive sublimate, and gold, of course in extreme dilutions.

W. H. Crisp.

Studies in ophthalmic science in honor of William Holland Wilmer. Octavo, 224 pages, illustrated. Chicago. Archives of Ophthalmology, 1934. (See also Amer. Jour. Ophth., v. 17, no. 5, p. 447.)

This beautiful volume represents the wide scope and unity of ophthalmology today. It has been planned and written by the pupils, associates and friends of Dr. Wilmer. Its appropriate frontispiece is a photographic reproduction of his portrait, painted three years ago. The studies begin with those of Adler, of Philadelphia, on Physiology of Visual Acuity, and H. Barkan, of San Francisco, Glioma Treated by Radium.

Probably the idea of such a volume originated with pupils and close associates of Dr. Wilmer, but there is no indication of who should have credit for this service. There is but one article from Baltimore, written by an old friend. The wider circle of friends is represented by articles contributed to the volume by residents of other principal medical centers of America and Europe. They include Sir Stewart and Lady Duke-Elder and Miss Ida Mann of London, Emile de Grosz of Budapest, Van der Hoeve of Leyden, Elschnig of Prague, Igersheimer of Frankfort, Lindner of Vienna and Magitot of Paris.

The "Foreword" gives a very brief account of the life and achievements of Dr. Wilmer. There are 84 illustrations, mostly of pathologic conditions, and three of them in colors. These papers were originally published in the January number of the Archives of Ophthalmology, which thus became a "Festschrift," but it is appropriate and convenient, to have them thus included in a substantial and handsome volume.

Edward Jackson.

Transactions of the American Academy of Ophthalmology and Oto-Laryngology. 619 pages. 103 illustrations. Douglas Printing Company, Omaha, 1933.

The value of the published transactions of any society depends largely on the scientific material presented at the meeting plus the list of members and the record of the activities of the society. The volume for 1933 of the American Academy of Ophthalmology and Oto-Laryngology is a fit companion for its predecessors. It is dedicated to Dr. Walter B. Lancaster, an excellent likeness of whom appears in the front of the book. Major General Robert U. Patterson was guest of honor and his interesting address on ophthalmology in Military Service is included.

Some of the newer suggestions in ophthalmic surgery are outlined by Dr. John M. Wheeler. A look into the future is always interesting and no one is better qualified to evaluate surgical possibilities than Dr. Wheeler.

The scientific program was an unusually good one. To discuss all the subjects considered would be impossible. One of the outstanding papers was that by Dr. William C. Finnoff and Edna M. Reynolds on "Spread of tuberculosis in the eye."

The illustrations throughout the text are excellent; for special mention, the fine reproductions of Dr. Bedell's anterior segment photographs, should be cited.

2064 names were carried on the membership roll on September 1, 1933. Thirty-one deaths occurred during the preceding year.

Of the committee reports, perhaps the most interesting is that on investigating the treatment for incipient cataract. The findings fall short of the almost universal opinion of ophthalmologists that medicinal treatment is valueless in clearing opacities. To state that the personal investigation by the committee and a study of the literature failed to indicate that there is any scientific proof that medical treatment of lenticular opacities will cause an entire restoration of the normal transparency of the lens once opacities have appeared is far from the convincing statement that ophthalmologists would like to refer to patients who describe the medicinal treatment which they say some one else has used successfully on their friends. There is a veiled implication in the report that medical treatment may cause at least partial absorption of cataracts.

The Editors are to be congratulated on this volume and especially the Editor in Chief, for combining so successfully the sections prepared by the Assistant Editors.

Lawrence T. Post.

Ophthalmological Society of Egypt. Bulletin of 1933 Meeting. Volume 26. Paper, 286 pages. Published by the Society, Cairo, 1933.

This volume deserves a place in every ophthalmological library in the world. Except four papers in French, and a

single brief paper in Arabic, this volume is all published in English. It contains a report from the committee which has been working to prepare Arabic equivalents for common English ophthalmic terms. This report gives 17 pages, carrying forward the work from "cornea, nerves of" to "Fergus' trephining for glaucoma." This is a practical movement of the ancient languages of the East to adapt themselves to the requirements of modern western science.

The international interest in ophthalmology is shown in its list of honorary members — "Ophthalmologists distinguished either by their work, or by the interest they have shown in the Society." The list numbers 21, and shows four from England, four from Paris, two each from Athens, Naples and Philadelphia, and one famous ophthalmologist each from Vienna, Heidelberg, Prague, Leiden, Budapest, and Bombay. The general members number 176, drawn from Egypt with fifteen million inhabitants, as many as the American Ophthalmological Society has gathered from a population of one hundred and twenty millions.

Of the 35 subjects of communications to the Society, 5 refer to operations, including plastic operations on the lower lid, cataract extraction with a conjunctival bridge, and a review of recent operative treatment for detachment of the retina. Among the six papers on conjunctival disease is one by Dr. Olitsky from the Rockefeller Institute, on spontaneous folliculosis of monkeys, one on clinical aspects of trachoma, and four on histopathology, from the Giza Laboratory.

A paper on pituitary tumors, referring to five cases, with fields and the pathological specimens from one of them; and the analysis of forty cases of proptosis, indicates the rich clinical field in which the members of the Society are working. There are also reports on the ocular complications of smallpox and measles. General therapeutics are represented by a paper on milk injections, taking up indications, contra-indications and dosage. There are numerous illustrations, chiefly photographs of cases, pathological specimens and tissue sections. The one color plate shows a case of naevo-carcinoma of the conjunctiva.

Most of the back numbers of this Bulletin can be obtained from the Director of the Ophthalmic Hospitals, Dawawin P. O., Cairo, Egypt.

Edward Jackson.

Blindness and the Blind in the United States. By Harry Best, Ph.D., LL.B. Octavo, 734 pages, 1934. The Macmillan Co., New York. (See also Amer. Jour. Ophth., v. 17, no. 4, p. 360.)

A certain automobile was advertised with the claim, when a better automobile is made we will make it. For fifteen years "The Blind" by Dr. Best has been the most complete work on the subject, in any language. This new book will continue his leadership in this department of literature. It might be considered a new edition and has the advantage of a second edition correcting erors found in its predecessor. But since 1919 the development in knowledge of blindness, what should be done to prevent it, and what can be done to help the blind, have gone on so rapidly, that this book has much the value of a new treatise on the subject. Its text has been increased only about 80 per cent; but the new knowledge of the subject doubles its value.

This account of blindness will be fully appreciated by those who found the earlier book most serviceable. It has been revised as well as extended. Its full index gives it great value as a work of reference for any who wish to study the varieties and causes of blindness or the needs, capacities, resources, or work of the blind. For the eye physician it must enlarge his sense of his responsibilities to his patients and his service to society in prevention of blindness and in spreading information in the community. A general understanding of the blind and the work they can do, has been sadly lacking.

The fifty-five chapters of this book are grouped in seven parts, the headings

of which give some idea of its broad scope. After a "Foreword" and "Introduction," Part I, Blindness and possibilities of its prevention, 162 pages, grapples with the newest and most important phase of the subject. Part II, General condition of the blind, 134 pages, includes many tables showing numbers, sex, race, ages, general conditions, extent of education, and chapters on economic conditions and legal treatment of the blind. Part III, 104 pages, Provision for education of blind children, takes up education in common schools, institutions, higher education and cost to the state. Part IV, Intellectual provision for adult blind, 56 pages, considers raised print, publications, libraries, and home teaching for the blind. Part V, 152 pages, Material provision for the blind, deals with homes for adults and children, industrial establishments, workshops, possible employment, pensions for the blind and indemnities for loss of sight. Part VI, 30 pages on Organizations interested in the blind, takes up private associations and public commissions. Part VII, 30 pages, states conclusions, with respect to work for the blind in the United States. There are four appendices, 34 pages giving tables; and one showing alphabets, in raised print, which are used by the blind.

The Table of Contents shows the wide range of matter brought together in this book. The index of ten double-column pages renders accessible the text relating to any single part of the subject, in which the reader may be at the time interested. The real greatness of this book appears only when one studies the notes in fine print, referring to the literature of each topic. These are placed at the foot of almost every page, and at the end of each chapter. Thus, in the chapter on Blindness and disease, there are 16 notes at the foot of the pages referring to ophthalmia neonatorum; and at the end of the chapter over 300 notes occupying almost 3 pages of fine print, referring to various causes of blindness.

The great collection of references to the literature, regarding blindness and the blind, might give the impression that this book portrayed the subject from the academic side; but this is not the case. Its author, the son of a country doctor, went from working in a New York Settlement House to teaching Sociology in the University of Kentucky. He made his first contacts with the handicapped, as teacher in a school for the deaf. He has a vivid understanding of the practical needs and difficulties of the blind. This makes him a real interpreter of their conditions and life interests, to his seeing readers. His practical judgment is shown by the emphasis he places on the prevention of blindness. His chapter on "The definitions of blindness," gives the difficulties that surround an attempt to define it, and brings together a collection of the widely distributed attempts to secure definite, accurate, and serviceable definitions. Every ophthalmologist should have this book, and should study it, if he would be a real counsellor of his patients, and teacher of his profession and the community. Edward Jackson.

Ultra-violet therapy in eye disease with a review of the action of other forms of radiant energy. By Frank W. Law, M.A., M.D., B.Chir., F.R.C.S. 78 pages. Cardboard covers. John Murray, Albemarle St., London, W. 1934. Price 5 shillings.

This clinical report is a valuable addition to the literature on the therapeutics of radiant energy. The first forty-four pages are devoted to ultraviolet therapy, the next ten to radium, eight to x-rays and four to infrared. A short foreword by Sir Stewart Duke-Elder stresses the value of such a clinical report as this.

Regarding ultraviolet rays the author concludes that general phototherapy has less value in ophthalmology than previous writers suggest but is a useful adjunct to treatment, especially in such cases as phlyctenular blepharitis and some forms of iridocyclitis. One difficulty is the uncertainty as to which cases will respond.

Local phototherapy on the other

hand "is of the utmost value in the treatment of all kinds of superficial lesions of the eye; in deeper lesions action is less certain . . . it has no effect whatever on nebulae, nor does it appear to have any considerable bactericidal action upon the conjunctiva. Its effect appears good in tuberculous iritis."

X-rays are found to be of value in a considerable number of conditions listed by the author but infrared rays are regarded as serving no therapeutic purpose in ophthalmic disorders.

The author concludes that the claims made for the therapeutic value of radium in ophthalmic conditions, especially in America, are too diverse and too enthusiastic.

Lawrence T. Post.

CORRESPONDENCE

Advisory Board for Medical Specialties

In order to elevate the standards of ophthalmology, to improve the efficiency of those claiming in their practice to be ophthalmologists and to standardize the training of eye specialists, the American Board for Ophthalmic Examinations was formed in 1915. It was the outgrowth of considerable study of committees named by the American Ophthalmological Society, the Section of Ophthalmology of the American Medical Association and the American Academy of Ophthalmology and Oto-Laryngology. This Board is the pioneer among the special boards to be formed. It consists of nine members, three from each of the component societies. Its members are chosen in the same manner as the presiding officers of the national societies and members can serve for no more than six years continuously. The Board's name was changed in 1933 to American Board of Ophthalmology to conform with the names of the other boards existing at that time. The other specialties which have already established boards are oto-laryngology, obstetrics and gynecology, dermatology, pediatrics. There is now under consideration the formation of boards in radiology, orthopedics, anesthesia, urology, etc.

In 1932 there was organized an Advisory Board for Medical Specialties whose purpose is to coordinate and cooperate with the various official groups interested in postgraduate education of specialists and to bring about a standardization of methods and requirements for the certification of specialists. This Advisory Board is composed of representatives from the following organizations: The American Hospital Association; the Association of American Medical Colleges, the Federation of State Medical Boards of the United States, the National Board of Medical Examiners, the American Board of Ophthalmology, the American Board of Oto-Laryngology, the American Board of Obstetrics and Gynecology, the American Board of Dermatology and Syphilology, and the American Board of Pediatrics. Examining boards in other specialties will be eligible to representation when they meet certain requirements.

The officers, elected in February, 1934, at Chicago, are as follows: President, Dr. Louis B. Wilson, Rochester, Minnesota; Vice-President, Dr. J. S. Rodman, Philadelphia; Secretary and Treasurer, Dr. Paul Titus, Pittsburgh; Executive Committee: Dr. Wm. P. Wherry, Omaha, and Dr. Walter B. Lancaster, Boston.

One of the aims of this Advisory Board is to act in an advisory capacity on undergraduate education as well as graduate instruction in the various specialties represented; also it will assist the Council on Medical Education and Hospitals in investigating and listing postgraduate facilities in America and to some degree abroad; it should thus be an important influence in effecting general elevation of the standards of training and practice of the various specialties.

It has been seriously suggested that the time will come when the various states will license physicians to practice as specialists and that the certificates of the various boards will be the basis of such licensure. One Canadian Province has already instituted licensure of all its specialists.

It is intended that this Advisory

Board for Medical Specialties will cooperate with the Council on Medical Education and Hospitals of the American Medical Association. The next edition of the Directory of the American Medical Association has been designed to publish information about all accepted special boards and will list conspicuously in this directory the names of those specialists who have been found to be competent and who have received the certificate of such special boards. There are plans under advisement for a directory of all certificated persons and this directory will also list postgraduate training facilities, residencies, internships, etc., in the various specialties as well as the general qualifications for certification.

A meeting of the Advisory Board will be held at Cleveland on Sunday, June 10, 1934, immediately prior to the annual meeting of the American Medical Association.

William H. Wilder, M.D.
Secretary,
American Board of Ophthalmology.

Bridle sutures in cataract extraction

To the Editor:

In the January number of the American Journal of Ophthalmology I read a note on the "Cataract Incision," with intense interest; in particular the part regarding "the tendency to push the eye around by the forward thrust." This leads me to call attention to something which I reported to the New England Ophthalmological Society about six months ago, and which I have been using now for about a year with a great deal of comfort.

I commonly use a superior rectus bridle suture, held tense with a hemostat snapped to the head cap. With this I use an external rectus bridle suture, which is held tense by my assistant during the section. Some of my confrères say they can use the external rectus stitch alone, without the superior rectus suture. I find the eye does not roll and that no forceps are needed at all, and that my attention is wholly concentrated on the section, and "nothing else intrudes upon the operator's mind."

W. Holbrook Lowell.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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1. GENERAL METHODS OF DIAGNOSIS

Abramovicz, I. **Collargol in biomicroscopy of the cornea.** Klinika Oczna, 1933, v. 11, pt. 4, p. 438.

The author recommends instillation of 5 percent collargol into the conjunctival sac immediately preceding a slitlamp examination. The stain held by the film of tears on the cornea serves as a yellow light filter. The anterior surface of the cornea has a bluish-green color and the optical section representing the corneal stroma has a brownish-green tint. This coloring accentuates the fine changes in the iris and cornea.

Ray K. Daily.

Böck, J. **Investigation of the anterior segment of the eye with the fluorescence microscope.** Zeit. f. Augenh., 1934, v. 82, Feb., p. 269.

Unstained paraffin and frozen sections of normal human bulbi which had been fixed in formalin were studied with a fluorescence microscope. The slides are illuminated with ultraviolet light but the microscope itself does not differ optically from those ordinarily used. The cornea is primarily fluorescent and most of this quality must be ascribed to Descemet's membrane. The sclera is exceptionally fluorescent to a degree that has not been described by others. Melanin does not fluoresce, but the lipofuscin of muscular activity does so to a great degree, which makes differentiation of these pigments very simple.

F. H. Haessler.

Foster, John. **A transparent protractor for scotometers.** Brit. Jour. Ophth., 1934, v. 18, Feb., p. 98.

The author has made a protractor out of heavy cellophane upon which the radii and circles are marked. This is placed over a Bjerrum screen. The heads of the pins which have been placed for outlining scotomata are readily observed and can be drawn freehand. Illumination is best coming from above and behind the observer.

D. F. Harbridge.

Masson, C. B. **The disturbances in vision and in visual fields after ventriculography.** Bull. Neurol. Institute of New York, 1933, v. 3, June, p. 190.

The author studied one hundred consecutive cases. Six cases of temporary blindness occurred. Three of the patients had normal fundi: in the others there was papilledema of two to four diopters. The pressure of the fluid in the ventricles ranged from 160 to 220 mm. One patient had marked reduction in visual acuity before ventriculography was done: In the other five vision was

normal or only slightly reduced. Two of the patients had marked visual field defects before the procedure. Three cases showed increased intracranial pressure. In two patients the loss of vision occurred during the manipulations incident to introduction of air, and in the other four vision began to fail from two to sixteen hours later. Four were operated on during the blind period, and in them the loss of sight averaged forty-five hours. In the two not operated on, the blind period lasted about twenty-three hours. All regained the visual acuity which they had had before the manipulation. No satisfactory explanation for this complication is found. M. E. Marcove.

Mayer, L. L. **A visual field slate.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1933, p. 295.

To obviate the necessity of an assistant in recording visual fields, the author has devised a slate, ten and one-fourth inches square, on each side of which a copy of the usual perimetry record twice the usual size is reproduced. The meridian lines and circles are marked on the slate in luminous paint. The examiner records the field measurements in white or colored chalk, and later may transfer the data to a permanent record. The slate is made by Modern Pattern Works, Chicago. (One illustration.)
George H. Stine.

Pexiederova, Ruzena. **Vital staining of the retina of albino rabbits, with trypan blue.** Ceskoslovenska Ofthalmologie, 1933, v. 1, no. 2, pp. 87-95.

Trypan blue was injected into the vitreous, and the eyes removed at intervals varying from two hours to eighteen days. The vitreous humor, the internal limiting membrane, and especially Müller's fibers stained first. Twelve hours after the injection Müller's fibers again become colorless. The number of the blue-stained cells in the outer nuclear layer of the retina had increased, and such cells were found also in the inner nuclear layer. The ganglion cells remained colorless. In the following days cells which typically absorbed the granules of trypan blue (histiocytes) appeared in the vitreous, the internal limiting membrane, the retina, and the nuclear layer. A long time after the injection degeneration of all retinal layers takes place. In this stage infiltration by typical histiocytes is to be found in all retinal layers as well as in the vitreous humor and even in the choroid. G. D. Theobald.

2. THERAPEUTICS AND OPERATIONS

Alexseev, H. **Diathermy in ophthalmology.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 1, p. 18.

The article contains a detailed report of eight cases of vitreous and corneal opacities improved by treatment with diathermy, and six cases (angioma, chalazion, trachoma) successfully treated with surgical diathermy.
Ray K. Daily.

Cepero, G., and Comas, C. **The present status of surgical diathermy in ophthalmology.** Rev. Cubana de Oto-Neuro-Oft., 1933, v. 2, Sept.-Oct., p. 251.

The fundamentals of medical and surgical diathermy and the extensive uses which are and can be made of it in ophthalmology are reviewed.
M. Davidson.

Cepero, G., and Comas, C. **Our two and a half years' experience with medical diathermy in ophthalmology.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, Nov.-Dec., p. 295.

Among the 210 cases treated, for a wide variety of conditions, the duration of treatment has been reduced to one-half in many cases in which diathermy acted like a specific. M. Davidson.

Filatov, V. **New methods of dealing with expulsive hemorrhages.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 1, p. 3.

Considering a suprachoroidal hemorrhage the basis of expulsive hemorrhages the author believes that an immediate trephine opening in the sclera, providing an external exit for the blood, can check the expulsion of the intraocular tissues and save the eyeball. The scleral opening should be behind the ora serrata, as close to the equator as

possible. In two cases of expulsive hemorrhage complicating cataract extraction this procedure checked the hemorhages. The final result was atrophy of the globe. Ray K. Daily.

Katz, P. A. **Triades and ionization in ocular physiotherapy.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 3, p. 261.

A combination of thermophore, cataphoresis, and radiophore is recommended in optic atrophy and also for inflammatory conditions. For glaucomatous optic atrophy the author substitutes the vibrator for the thermophore. For inflammatory conditions of the anterior segment of the eyeball and for juvenile glaucoma the author uses calcium ionization. Ray K. Daily.

Knapp, Paul. **To the question of injurious effects of diocaine.** Klin. M. f. Augenh., 1934, v. 92, Feb., p. 230.

Knapp gives a synopsis of experiences with diocaine as anesthetic, which were in general favorable, whereas Ammann, Feilchenfeld and Vogt have reported injurious effects.

C. Zimmermann.

Lipkin, I., and Spaskii, B. **The therapeutic application of colloidal solutions.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 1, p. 25.

The authors contend that Besredka's antivirus has no specific effect, and acts as a colloidal solution which expels the virus from the diseased cells, and by combining with healthy cells makes them impermeable to the virus. The authors used repeated instillations of a three percent aqueous solution of India ink in ten cases of serpiginous ulcer and four cases of conjunctivitis. Detailed reports of these cases show the effectiveness of the treatment.

Ray K. Daily.

Pankov, K. **Therapy of bacterial diseases of the external portion of the eye.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 4, p. 385.

The author finds rivanol a most valuable theurapeutic agent, superior to all other medicaments for inflammatory conditions of the conjunctival sac.

Ray K. Daily.

Riechert, T. **A needleholder for Toti's operation.** Klin. M. f. Augenh., 1934, v. 92, Feb., p. 233. (Ill.)

The tip of the needleholder, which is illustrated, is bent at a right angle. It is also applicable in cases in which other models fail on account of the shape and depth of the wound canal.

C. Zimmermann.

Shereshevskaia, L. **Diathermy in ocular diseases.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 1, p. 14.

A diathermic current of 0.2 to 0.4 amperes was passed through the eyeball for five to ten minutes by applying to the eyeball a glass electrode filled with saline solution, and fastening the other electrode to the occiput. This treatment was followed by improvement in three of five cases of intractable blepharo-conjunctivitis, was ineffective in two cases of dendritic keratitis, was very effective in four cases of episcleritis and ten cases of iridocyclitis, and hastened absorption of exudate in two cases of acute choroiditis.

Ray K. Daily.

Tissot-Dauguette. **Visual disturbances after injections of acetylarsan.** Arch. d'Opht. 1934. v. 51, Jan., p. 17.

The visual disturbances after administration of acetylarsan range from functional subjective disturbances to complete permanent blindness. Certain individuals seem hypersensitive, but it is impossible to designate these patients before treatment. In practically all cases it was considered that the toxic effect of the phenylarsenic group was the cause, and not an activation of the syphilitic process. Patients should be selected, the dosage should not be too great, and injections should not be too frequent. M. F. Weymann.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Adler, F. H. **Problems in the physiology of visual acuity.** Arch. of Ophth., 1934, v. 11, Jan., pp. 6-19.

The functional capacity of the retina is discussed under the headings of light sense and its modifications, color and form sense. The threshold of the light

sense, or minimum visible, is influenced by aberrations in the ocular refractive system and by sensory adaptation. The eye perceives about 660 gradations in intensity. The color sense permits discrimination of different spectral wavelengths. The form sense depends upon the minimum separable or the ability to discriminate two separate points and the alining power of the eye or the ability to detect a slight change in contour. The alining power is about four times as sensitive as the minimum separable. Visual acuity, as determined with the Snellen chart, is not only a test of these retinal functions, but involves other physiologic and psychologic factors such as attention, fixation, and familiarity with the test type.

J. Hewitt Judd.

Anelli, D. **Micropsia in mydriasis.** Boll. d'Ocul., 1933, v. 12, May, pp. 457-473.

Subjects under atropin mydriasis, whether emmetropic or with corrected refractive errors, pointed at an object inside of its real position when this was near their near point. Because a very strong accommodative effort was necessary to see the object, it was judged to be smaller than it was. The phenomenon was not present in adrenalin mydriasis. (Bibliography.)

M. Lombardo.

Bertotto, E. V. **Contact glasses and their application.** Arch. de Oft. de Buenos Aires, 1933, v. 8, Nov., pp. 531-538.

After a short discussion of the history and indications of contact glasses, a case is reported of a patient with bilateral keratoconus who has worn contact glasses for several hours daily without discomfort, and with considerable improvement of vision.

R. Castroviejo.

Chapman, V. A. **Safety spectacles for the color blind.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1933, p. 301.

Red-free-filter glass is fitted to the upper part of each spectacle lens, so that by tilting the head forward and looking through the upper part of the lenses, the color-blind person may be sure of the color of traffic lights. Red shows black through the filter and the confusion in deciding whether the traffic signal is green or red is avoided. (One illustration.)

George H. Stine.

Colomba, N. **Astigmatic behavior during accommodation.** Ann. di Ottal., 1934, v. 62, Feb., p. 132.

There has been much discussion and difference of opinion among ophthalmologists as to neutralization of corneal astigmatism by partial or segmental action of the ciliary muscle. Twenty-one cases of astigmatism were studied skiascopically first with the accommodation at rest, then at a distance of 25 cm. The cases selected were those having simple and compound hypermetropic and simple and compound myopic astigmatism. In the majority of cases spherical accommodation only was found, in a few the accommodation was asymmetric, but the amount of astigmatism was not altered. In mixed astigmatism with a myopic meridian of four diopters there was no accommodative effort for near vision. (Bibliography.)

Park Lewis.

Dello Ioio, G. **Research on the behavior of the focal surface in spherical ametropia in relation to the form and position of the retinal surface.** Ann. di Ottal., 1934, v. 62, March, p. 191.

The author's examinations were made by skiascopy on the horizontal meridian from the fortieth degree to the maximum angle. Ten highly myopic and ten highly hypermetropic subjects were investigated. In high myopia the refraction of the sagitally incident oblique rays diminished very gradually at the periphery of the dioptric system, and in strongly hyperopic eyes the refraction of these rays was little modified; whereas tangentially the augmentation was marked. The author thinks it probable that the retinal surface of the high myope is paraboloid, and that of the hypermetrope spherical. (Bibliography and four graphs.)

Park Lewis.

Eames, T. H. **Improvement in reading following the correction of the eye**

defects of nonreaders. Amer. Jour. Ophth., 1934, v. 17, April, pp. 324-325.

Gifford, S. R., and Barth, E. E. **Visual sensation produced by roentgen and radium rays.** Arch. of Ophth., 1934, v. 11, Jan., pp. 81-91.

The previous investigations of this phenomenon are reviewed. The authors give the results of their experiments in which dark-adapted observers with normal and opaque media were tested. Short exposures with small amounts of radiation were made through a viewing tube fitted with a lead slide in which were variously shaped openings of from 5 to 0.2 mm. The authors conclude that, while examination of the vision by means of roentgen rays gives some information as to the function of the peripheral retina in patients with opaque media, it does not serve in judging of macular function, and in certain patients the results are unreliable. The sensation is apparently due to direct photochemical effect on the rods.

J. Hewitt Judd.

Gradle, H. S. **Experimental glasses for reducing vision, and for obtaining binocular vision in unilateral aphakia.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1933, p. 310.

Following the experiments of Snell the author applies etched glasses in squint to reduce the vision of the good eye to that of the amblyopic eye, so that the vision of the two eyes may be kept more uniform. Experiments are also under way to devise glasses for reducing the size of the image of the aphakic eye, and for increasing that of the phakic eye, in order to promote binocular vision in unilateral aphakia.

George H. Stine.

Harms, Heinrich. **Observations on subjective straight forward sight.** Graefe's Arch., 1933, v. 131, p. 297.

The position of images, in respect to the conception of our own body in space, was designated by G. E. Müller as egocentric localization. The system of coordinates, upon which rests the position in space of images in binocular vision, is formed around three chief planes of sensation, median, horizontal, and frontal.

Binocular and monocular sight directed straight forward was found to be displaced toward the right in relation to the objective median plane. The greater subjective exactitude and objective certainty of the right eye straight forward in comparison with the left eye straight forward was considered to be due to dominance of the right eye. The influence of psychological factors (attention, ideas) upon egocentric localization is discussed. Tschermak's theory of an indirect sensory function or a myosensory tension in the eye muscles is quoted as offering the best explanation of the processes of egocentric localization. (This paper is so highly technical as to preclude satisfactory abstracting.) H. D. Lamb.

Hudelo, A. **Astigmatism after operation for chalazion.** Arch. d'Opht., 1934, v. 51, Jan., p. 33.

A chalazion was excised through the inner surface of the upper lid. Next day vision was blurred, and minus one cylinder at 105° gave normal vision. After six days the astigmatism, as measured subjectively and by the keratometer, had disappeared completely. The astigmatism is explained by assuming that the large amount of novocaine used had an anomalous effect on the sympathetic nerves to produce paresis of tonus of the upper lid, lack of support by which caused the cornea to assume the abnormal curvature.

M. F. Weymann.

Jackson, E. **Cycloplegia for diagnosis.** Arch. of Ophth., 1934, v. 11, Jan., pp. 133-140.

Although cycloplegia adds great certainty to the diagnosis of refractive errors imperfect results are often obtained because of failure to recognize the symmetrical and irregular aberrations of the dilated pupil and because of lack of exact knowledge of the effects of cycloplegics and the reactions and results that follow their use. Attention is called to the proper method of application and the variations between peripheral refraction and that of the central

or visual zone. The relative strengths of cycloplegics are homatropin 1, atropin 30, and hyoscyamin 75. Skiascopy gives a reliable method of determining when cycloplegia is complete.

J. Hewitt Judd.

Jackson, E. **Practical lenses, a trial set for school physicians,** Trans. Sec. on Ophth., Amer. Med. Assoc., 1933, p. 147.

This set is composed of twelve pairs of spherical and eight pairs of cylindrical lenses, with which, in combination, any spherical with 0.25 D. intervals to 6 D., and by 1 D. intervals up to 30 D. may be had. Intervals of 0.12 D. are eliminated as not useful in any trial set. For the cylinders there are 0.25 D. intervals to 6 D. and 1 D. intervals to 9 D. Cross cylinders are a necessary part of the set. All lenses are of the plano type which allows combination without loss of practical accuracy. All lenses are thirty-one millimeters in diameter, and they are used in simple steel wire frames. (Discussion.)

George H. Stine.

Katznelson, A. **The question of heredity in total color blindness.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 4, p. 354.

The article contains a schematic report of three generations of two families containing numerous members afflicted with color blindness.

Ray K. Daily.

Kravkov, S. W. **Visual acuity and illumination in the discrimination of white objects upon a black background.** Graefe's Arch., 1933, v. 131, p. 452.

Visual acuity depends both upon irradiation and upon differential sensibility. If corresponding ordinates of the curves established by Houstoun for differential sensibility and of the values determined by Kravkov and Biletzky for the effects of light irradiation are multiplied together, we obtain a new curve which approximates the curve of visual acuity under similar experimental conditions for discrimination of white objects upon a black background.

H. D. Lamb.

Pflugk, Albert. **New methods in research on the theory of accommodation. Communication 3. Contribution to knowledge of currents in the aqueous humor.** Graefe's Arch., 1934, v. 131, p. 614.

Moving pictures of the reaction of the pupil to light showed a latent period (duration 0.2 second), and thereupon first rapid and then gradually slower contraction of the pupil. After intravenous injection of five percent solution of fluorescein, extrusion of fluorescein-colored aqueous from the pupil could be noted after several minutes of energetic reaction of the pupil to light.

H. D. Lamb.

Rossi, G. **Time of accommodation in hyperthyroidism (Flojani-Basedow disease).** Arch. di Ottal., 1933, v. 40, Nov.-Dec., p. 483.

In nine cases examined the accommodation time was increased as compared with normal subjects. Whereas the normals varied between 0.1 and 0.25 second, those afflicted with Basedow's disease showed an accommodation time varying between 0.3 and 0.4 second. The author interprets this as due to insufficiency of the ciliary muscle resulting from disturbance of the sympathetic nervous system.

Herman D. Scarney.

Rugg-Gunn, A. **Data concerning radiation and protective glasses with a note on retinoscopes.** Brit. Jour. Ophth., 1934, v. 18, Feb., p. 65.

This contribution discusses radiation, electromagnetic radiation, and solar radiation. Solar radiation is discussed under ultraviolet rays, infrared rays, and visible rays. Spectacle glass is ordinary crown glass of rather low refractive index. It transmits light with slight falling off of all rays down to 3,500 angstroms. Flint glass is of higher refractive index and transmits a narrower range. Glass containing metals is most absorbent of short wave-lengths. Colored glasses usually lack proper standardization. The compositions of many of these are discussed. (Seventy references.)

D. F. Harbridge.

Sallmann, Ludwig. **Observation on lenticular astigmatism.** Graefe's Arch., 1933, v. 131, p. 492.

Corneal astigmatism was eliminated with the contact glass and the remaining astigmatism was measured by Lindner's cylinder skiascopy. Among 90 eyes there was in 12 lenticular astigmatism of 0.25 D., in 15 of 0.5 D., in 17 of 0.75 D., in 22 of 1 D., in 12 of 1.25 D., in 4 of 1.5 D., and in 2 of 2 D. In the great majority the chief meridian of the lenticular astigmatism was turned in relation to that of the corneal astigmatism. This rotation might reach even 40° but actually varied between 10 and 30°; and it was more pronounced with greater intensity of the astigmatism. H. D. Lamb.

Samoilov, A. **Clinical studies in color blindness.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 1, p. 22.

Fifty persons with normal color vision, as shown by the Nagel anomaloscope, were tested with the sixteenth and eighteenth editions of Stilling's color plates. Read without mistakes in the sixteenth edition were only the second plates of the first and second group, all plates of the third group, the second plate of the sixth group, and the first plate of the tenth group; and in the eighteenth edition the second plate of the third group, both plates of the fourth group, and the first and second plates of the fifth group. In the reading of the other plates these persons with normal color vision made numerous mistakes, which obviously could not be ascribed to color blindness.

Ray K. Daily.

Santonastaso, A. **Research and consideration of the influence of acetylcholin on accommodative spasm.** Ann. di Ottal., 1933, v. 61, Dec., p. 881.

Acetylcholine having a direct effect in spasm of the retinal vessels, the author was led to believe that it would be equally useful in spasm of the accommodation and that by its use the vision of young myopes might be conserved, and the development of the progressive form retarded or stopped. Experience gained in his clinic supports this belief. Acuity of vision has been improved in emmetropia, hypermetropia, astigmatism, presbyopia, and even in aphakia as well as in myopia. Park Lewis.

Sison, A. B. M. **Ophthalmic migraine of allergic origin.** Jour. Philippine Islands Med. Assoc., 1933, v. 13, May, p. 250.

The author discusses a very severe case of ophthalmic migraine of allergic origin. Beside the usual symptoms of migraine, this patient developed a hemianesthesia with apparent hemiplegia which lasted about five days and cleared up. The vision began to clear after the fifth day, but the field changes lasted for three weeks. The examination of the eyes was entirely negative except for congestion of both macular regions. The patient was hyperopic and had been under a severe nervous strain.

M. E. Marcove.

Trovati, E. **The reserve retinal function outside the known limits of the visual field.** Boll. d'Ocul., 1933, v. 12, April, pp. 364-382.

By the angular deviation of an eye up to thirty degrees temporally, in normal subjects, an increase of the nasal limits of visual field was obtained. The same result was obtained in ten patients affected by divergent strabismus of the right or left eye. From these findings the author concludes that there exists a peripheral retinal functional reserve outside the known limits of the visual field. (Bibliography.)

Melchiore Lombardo.

Urio, Hector. **The myopic degenerations of the fundus in anisometropia.** Graefe's Arch., 1933, v. 131, p. 377.

Thirty-five cases of anisometropia with at least four diopters of difference were investigated. Of the 35 strongly myopic eyes, 8 showed inverse astigmatism, while the remaining 27 had astigmatism with the rule. The weaker myopic, emmetropic and hyperopic eyes showed only in 3 cases inverse astigmatism and in the remaining 32 cases astigmatism with the rule. In 20 cases there was an asymmetrical position of

the principal axes. Fundus changes occurred in 34 cases and almost exclusively affected only the myopic eye. Of the 34 cases, 21 showed the myopic crescent and 13 cases both the myopic crescent and changes in the macular region. In the majority of the cases the macular degenerations occurred only with myopia of eight diopters or more. Any theory of myopia must completely consider anisometropia. H. D. Lamb.

Zaionchkovski, M. **The relation of depth perception to visual acuity and refraction.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 1, p. 25.

A tabulated report of the study of these three ocular functions in 1,018 men shows that excellent depth perception is found only in people whose visual acuity is not below normal. Depth perception is diminished even by slight reductions in visual acuity. Good stereoscopic vision is found only exceptionally among ametropes; in such cases the ametropia is of very low degree and vision is normal.

Ray K. Daily.

Zanettin, G. **The behavior of indirect visual acuity in spherical ametropias.** Ann. di Ottal., 1934, v. 62, Jan., p. 22.

Studies were made of ten high myopes and of ten high hyperopes. In myopia there was more than normal lowering of visual acuity in the perimacular region in relation to central vision. This was more evident when macular vision was also subnormal, and also as the degree of myopia decreased and direct vision was reduced. Accompanying this disproportionate reduction of acuity was a more or less accentuated perimacular depigmentation, giving evidence of extensive circumpapillary sclerochoroiditis but similar peripheral limitation of vision was found for zones of the retina in which no changes in structure could be ophthalmoscopically discovered. Only in the highest grades of hyperopia were any peripheral limitations present, and then only in those cases in which macular vision was also defective. (Bibliography.)

Park Lewis.

4. OCULAR MOVEMENTS

Abramovicz, I. **Cases of oculomotor paresis.** Klinika Oczna, 1933, v. 11, pt. 4, p. 444.

A child seven years of age was brought to the hospital with the history of ptosis and divergent strabismus of the right eye, which had set in at the age of three years following measles. The superior rectus, the inferior oblique, and the internal rectus were paretic; the inferior rectus was practically normal. The lower lid did not move when the patient looked to the right, down, and in. On looking to the left and up the lid was elevated. On looking up the right eyeball remained immovable; but the right lid was elevated as soon as the left eyeball passed fifteen percent above the horizontal meridian.

The second case is one of intranuclear ophthalmoplegia, explained by a lesion of the posterior longitudinal bundle. A man twenty-two years of age came complaining of diplopia of a week's duration. He had a slight divergence of the right eye on looking straight ahead. Looking to the right the left eye moved very slightly beyond the midline. Looking to the left the right was immovable, and the left eye moved slightly. Vertical motion and convergence were normal. With uniocular fixation both interni and the left externus were immovable. The patients recovered within two months, the right externus being the last to recover. (Photographs.)

Ray K. Daily.

Armstrong, E. L. **The optic angle in relation to strabismus.** Amer. Jour. Ophth., 1934, v. 17, April, pp. 291-296.

Bielschowsky, A. **Combination of functional (psychogenic) with organic disturbances of the oculomotor apparatus.** Klin. M. f. Augenh., 1934, v. 92, Jan., p. 1.

The occurrence of ocular palsies due to hysteria is still a matter of dispute. In many cases repeated examinations yield varying results and a functional (psychogenic) base may be assumed until a careful registration of all points of the clinical picture and critical application of exploratory methods yield

a correct interpretation. In other cases careful investigation proves that the organic symptoms may be accompanied by a functional neurosis. To illustrate the diagnostic difficulties a few clinical histories are given in detail. In a third group, including spastic disorders particularly of the lids and of the convergence-accommodation apparatus, the signs of functional neurosis are unequivocal. Dread of fusion (horror fusionis) is demonstrated by another case.
C. Zimmermann.

Bielschowsky, A. **Exophoria and excess of divergence.** Klin. M. f. Augenh., 1934, v. 92, Jan., p. 11.

A case belonging to the group mentioned in the preceding article and observed for eleven years is discussed with regard to the question whether certain forms of exophoria are due to excess of divergence, which seems to be one of the rarest disturbances of the oculomotor apparatus.
C. Zimmermann.

Brandenburg, K. C. **An inexpensive device to facilitate orthoptic exercise.** Amer. Jour. Ophth., 1934, v. 17, April, pp. 345-346.

Csapody-Mocsy, Martha. **Contribution to the pathology of concomitant squint.** Klin. M. f. Augenh., 1934, v. 92. March, p. 385.

As school oculist the authoress examined for rickets 315 cases of convergent squint among 8,000 children. As 132 had manifest hypermetropia of 2 D. or more, the explanation of squint according to Donders was somewhat justified. Sixty-seven percent of this group had rickets. A second group of 183 squinting cases had no or less than 2 D. hypermetropia, and seventy-nine percent of these had rickets. The difference in frequency of rickets as between squinting school children and those who came to the pediatric clinic for other diseases was quite marked, and was greater in proportion to the squinting cases which were not hypermetropic (79 percent rickets) than to the hypermetropes. All children with convergent squint (both groups) more often showed symptoms of rickets than the general group of infants of the same population. C. Zimmermann.

Fields, Maxwell. **Paradoxical images in vertical-rectus palsies.** Amer. Jour. Ophth., 1934, v. 17, March, pp. 245-247.

Hughes, W. L. **Improved Maddox rod test.** Amer. Jour. Ophth., 1934, v. 17, March, p. 250.

Lippmann, Otto. **Symptoms of degeneration and the inferiority of one-half of the body in their significance for squint.** Klin. M. f. Augenh., 1934, v. 92, March, p. 370.

Squint is not a sign of degeneration. Stammering among squinters is not more frequent than in the nonsquinters. Lefthandedness causes no disposition to squint. There is an influence of the dominant side of the body upon the squinting side, especially in equivalent eyes. In general the left eye squints more frequently than the right. When there is a disposition to strabismus lefthandedness favors a deviation of the right eye. C. Zimmermann.

Mandelbaum, J., and Unger, K. **A case of congenital paralysis of ocular movements.** Klinika Oczna, 1933, v. 11, pt. 4, p. 453.

A man forty-eight years of age came with influenza. He did not know that he had any ocular abnormality. On examination he was found to have bilateral congenital paresis of the oculomotor and abducens nerves. The right eye was capable of very slight vertical excursions. The left eye had in addition some movement of the internal rectus. (Photographs.) Ray K. Daily.

Nugent, O. B. **Superior rectus muscle forceps.** Trans. Sec. on Ophth. Amer. Med. Assoc., 1933, p. 305.

This instrument is a double tenaculum which permits the surgeon to pick up the muscle without a lid hook or stop speculum in place. The points are made like the points of an ordinary cutting needle, to facilitate their passing under the superior rectus muscle. (Illustration.) George H. Stine.

Ohm, J. **Elicitation of optokinetic nystagmus in the normal subject by means of a concentric rotating cylinder. Communication to nystagmus no. 34.** Graefe's Arch., 1933, v. 131, p. 401.

Brunner incited optokinetic nystagmus by having the person examined look with raised eyes upon the inner surface of a rotating paper cylinder 70 cm. in diameter and 30 cm. high, placed above the head. Acting on the same principle Ohm placed the turning chair in the middle of a cylinder of sheet-iron 2.5 m. in diameter, on the inside of which were painted white and black stripes 165 cm. high and 8 cm. broad. This apparatus is to be employed when the optico-oculomotor system does not react to the ordinary rotating drum. The method merits a place among tests for malingering. If a visual field extending 15° on each side is admitted, then the nystagmus is first obtained by excluding with a screen all the field except this 30°. If the nystagmus is no greater when the screen is entirely removed, it can be concluded that the functioning part of the retina extends no more than 15° to each side of the fovea. H. D. Lamb.

Ohm, J. **The nystagmus of total color blindness.** Zeit. f. Augenh., 1934, v. 83, March, p. 1.

The author displays nystagmograms from one patient with total color blindness. The movements were pendulum-like with an occasional irregular jerk. The tracings differed from those of miner's nystagmus in that opticokinetic nystagmus was absent or weak.

The explanations given for this nystagmus are discussed. Ohm postulates a supranuclear center which rhythmically discharges impulses to the nuclei, color vision only coming about when periodic variation in the discharges in the chain of neurones of the optic tract reaches a certain minimum frequency. Total color blindness would result where the frequency could not reach the necessary level with the illumination of daylight, just as twilight illumination fails to develop this frequency in the normal eye. F. H. Haessler.

Perez Bufill. **The surgical treatment of squint.** Arch. de Oft. Hisp.-Amer., 1934, v. 34, Feb., p. 65.

In tenotomy undercorrection, and in advancement overcorrection should be aimed at. The author sutures the cut tendon as far back as possible over a three millimeter anterior stump, and uses an extra suture to secure the posterior segment further forward if short, or splits it and buries it with sutures, one end above and the other below, beneath the conjunctiva, if long.

M. Davidson.

Peter, L. C. **The recession operation with special reference to the author's suture.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, p. 520.

Historical review of the recession suture is followed by the author's modification and discussion of the O'Connor cinch-shortening operation.

Beulah Cushman.

Roche, W. J. **The etiology of miner's nystagmus.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, p. 529.

In pits in which a covered-in passage allows gradual change from peripheral to central vision on leaving the mine, there have been no new cases of nystagmus claiming compensation. Enough light should be used to allow the worker to use central vision. This requires a cap lamp of 6 c.p. or more. Flood illumination should be used where possible. The laboratory of each company should be fitted with a photometer, and photometric measurements of several lamps from the different pits should be taken from time to time.

Beulah Cushman.

Salus, Robert. **On congenital retraction of the eyeball.** Klin. M. f. Augenh., 1934, v. 92, Jan., p. 79.

Three cases of retraction with convergent strabismus are reported. In all the external rectus was very much altered, but it was not the cause of the retraction, which remained unchanged after careful detachment of the muscle from the sclera. In one case the retraction subsided after cutting a fibrous band on the medial side behind the in-

ternal rectus. At the same time limited abduction became possible, although the external rectus showed lipomatous pseudohypertrophy and contained very few muscular fibers. In the second case no medial band could be found, but it must have existed since the external strand was not responsible for the retraction. In the third case the abduction improved considerably after separation of the medial strand. This returning abduction seemed to indicate that the defect could only in small part be due to alteration of the external rectus itself. C. Zimmermann.

Swett, W. F. **A case of convergent strabismus and amblyopia.** Amer. Jour. Ophth., 1934, v. 17, April, p. 345.

5. CONJUNCTIVA

Bargy, M. **Pterygium and trachoma.** Rev. Internat. du Trachome, 1934, v. 11, Jan., p. 39.

The apparent antagonism between pterygium and trachoma has been described by Jean Sédan for Marseilles. Delanoë for Morocco, and Nataf for Tunisia. Bargy states that these findings do not apply for Indo-China since 1,026 operations for removal of pterygia were performed among 38,233 trachomatous patients. Phillips Thygeson.

Bezecny, R., and Bieringer, S. **Histology of the conjunctiva in summer prurigo.** Klin. M. f. Augenh., 1933, v. 91, Dec., p. 870. (Ill.)

A woman aged thirty-two years, with latent lues, had had since her eighth year a skin eruption which relapsed every year in February. The eyes had been affected since her seventeenth year. In the outer part of the ocular conjunctiva were whitish-yellow exuberances with cysts separated from the clear cornea by a stripe like gerontoxon. The palpebral conjunctiva was unchanged. The slitlamp did not reveal the typical vascular changes of spring catarrh described by Elschnig. Histologically there were proliferations of the epithelium leading to cyst formation, epithelial changes suggestive of eczema, and slight connective tissue changes. The urine contained hematophorphyrin, indicating a near relationship between hydroa and summer prurigo. C. Zimmermann.

Borel, G. **A new oculopalpebral syndrome.** Ann. d'Ocul., 1934, v. 171, March, pp. 207-222.

For this very rare condition the title "conjunctivitis pseudomembranacea plasmatica lignosa" is suggested. The patient was a three-year-old girl with tumors of both upper tarsi, lardaceous, of almost cartilaginous consistence, and several millimeters across. The tumors had been excised several times previously. After excision by the author recurrence was manifest in eighteen days. Microscopically there was no evidence of malignancy. The dense hyaline tissue was poor in cell nuclei but was infiltrated with plasmocytes, lymphocytes, and eosinophiles. Bacteriological studies were negative, and the tissue could not be cultured or transplanted. Recurrence always follows removal, and the condition may be fatal. No cure is known. H. Rommel Hildreth.

Candian, F. L. **Research on the etiology of trachoma.** Ann. di Ottal., 1933, v. 61, Dec., p. 890.

Opinions as to Bacterium granulosis of Noguchi have differed so greatly that the writer investigated in animals and in human subjects the possibility of trachoma being dependent upon a filtrable virus. The results were practically negative. The author believes the constitutional condition should be studied to determine whether the infection is of primary or secondary origin. (Bibliography.) Park Lewis.

Cuénod, A., and Nataf, R. **Follicles and papillae in the first stages of trachoma.** Folia Ophth. Orientalia, 1933, v. 1, July-Sept., p. 257.

The authors state that the follicle is an essentially lymphoid element, more or less vascularized, while the papilla is an essentially vascular element which has undergone lymphoid infiltration. The follicle is a lymphatic reaction against the virus of trachoma while the papilla represents a vascular reaction to the follicles. The authors believe that

many ophthalmologists do not distinguish between the two structures and that many cases of so-called follicular conjunctivitis actually have no follicles. Biomicroscopy offers the most satisfactory method of making the distinction. In trachoma without secondary infection the follicles usually precede the papillae in appearance. The characteristic follicles of early trachoma consist in slightly elevated pale grayish avascular areas over the tarsal conjunctiva.

Phillips Thygeson.

Cusumano, A. **Tuberculosis of the conjunctiva.** Boll. d'Ocul., 1933, v. 12, May, pp. 447-456.

A man of twenty-six years showed swollen lids and mucopurulent discharge from both eyes. His upper tarsal conjunctivae showed large and small papillae and the bulbar conjunctiva was slightly chemotic. Bacteriologic examination was negative, but culture and biologic test in guinea-pigs were positive for tuberculosis. Microscopic examination of the conjunctiva revealed lymphocytic and epithelioid elements but no Langhans giant cells. The positive test for tuberculosis enabled the writer to differentiate this form of conjunctivitis from trachoma. (Bibliography.) M. Lombardo.

Dejean, C. **Lymphoid hypertrophy of the conjunctiva in the form of opalescent protuberances.** Arch. d'Opht., 1933, v. 50, Dec., p. 801.

In three cases a peculiar type of lymphoid hypertrophy of the conjunctiva was found. The lower cul-de-sac was most involved by longitudinal translucent folds which showed microscopically a diffuse and follicular lymphoid hyperplasia with some plasmocytes and histiocytes. The lesions, which appeared to be of months to years duration, produced only slight symptoms other than annoyance and lacrimation, tended to heal spontaneously with time, and were uninfluenced by therapy. (Seven photomicrographs.)

M. F. Weymann.

François, Jules. **Inflammatory ectropion and its treatment by total excision of tarsus and conjunctiva.** Arch. d'Opht., 1933, v. 50, Dec., p. 818.

The writer adds inflammatory ectropion to the usual classification and explains its genesis. It involves inflammation of lid margin, conjunctiva, and tarsus. Complete excision of conjunctiva and tarsus is recommended for its cure. No sutures are placed. (Diagrams, photographs.) M. F. Weymann.

Lokshin, S. **A grave case of bilateral tuberculous conjunctivitis.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 4, p. 381.

A fourteen-year-old girl had involvement of the lacrimal sacs, conjunctivitis with profuse secretion and coxcomb excrescenses, and vascularization of the corneas. The diagnosis was made by inoculation into a guinea pig.

Ray K. Daily.

MacCallan, A. F. **Clinical indications of trachoma.** Ann. di Ottal., 1934, v. 62, Feb., p. 152.

MacCallan's views, as previously published, are here stated in Italian translation.

MacCallan, A. **The clinical signs of trachoma.** Rev. Internat. du Trachome, 1934, v. 11, Jan., p. 3.

MacCallan lists the diagnostic signs of trachoma in the following order: (1) follicles on the upper tarsal conjunctiva; (2) papillary overgrowth sometimes masking follicles; (3) pannus; (4) limbal follicles, called Herbert's rosettes, or their cicatricial remains, called Herbert's peripheral pits; (5) cicatrices on the upper tarsal conjunctiva; (6) permanent thickening of the fibrous tissue of the upper lid; (7) ptosis; (8) sinuous lid border; (9) posttrachomatous degenerations, consisting of small cysts filled with inspissated material; (10) corneal facets; (11) epithelial plaques of conjunctiva and cornea; (12) corneal infiltrations; (13) trichiasis and entropion.

The author believes that the combination of pannus with any of the other signs given above is pathognomonic of trachoma.

Phillips Thygeson.

MacCallan, A. F. **Pterygium and trachoma.** Rev. Internat. du Trachome, 1934, v. 11, Jan., p. 38.

According to Jean Sédan pterygium is rare among trachomatous patients in Marseille. MacCallan feels that this must be due to local climatic conditions since pterygium is very common in Egypt. Phillips Thygeson.

Marchesini, E. **Bismuth therapy in trachoma.** Ann. di Ottal., 1934, v. 62, Jan., p. 44.

Bismuth was tried in one hundred cases of clinical trachoma. Of the sixteen simple florid cases, while none were cured, nine were much benefited, six slightly improved, and one unimproved. Of twenty-three complicated florid cases, four were cured, eleven much benefited, six slightly improved, and two unimproved. Of ten simple cicatricial cases, six were cured, two slightly improved, and two unimproved. Of forty-seven complicated cicatricial cases, twenty-four were cured, eleven greatly improved, six slightly helped, and six not at all. (Bibliography.)

Park Lewis.

Meyerhof, Max. **Clinical considerations on acute trachoma and follicular conjunctivitis.** Folia Ophth. Orientalia, 1933, v. 1, July-Sept., p. 262.

Meyerhof mentions the many similarities in onset between acute trachoma and acute follicular conjunctivitis but regards the two as distinct diseases. Acute trachoma, he states, begins like an acute diffuse conjunctivitis. There is general infiltration, not follicular, of the conjunctiva, which is later followed by follicle formation, pannus, and corneal ulceration. The difference between the two diseases lies in the sequelae, the most important of which is pannus.

Phillips Thygeson.

Michailov, H. M. **Cytology of trachoma.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 3, p. 302.

A smear of the contents of gently expressed trachoma follicles showed among the cellular elements a predominance of lymphoblasts; there were also numerous lymphocytes, some epithelial cells, a few erythrocytes, and rarely white blood cells. In advanced cases the lymphoblasts were few and the lymphocytes were numerous, with polynuclears and erythrocytes appearing in increasing numbers. The author concludes that the lymphoblasts are the predominant cellular element in the trachoma follicle, but that with the admixture of blood the lymphoblasts are crowded out by the lymphocytes.

Ray K. Daily.

Perez Llorca, J. **Treatment of trachoma by instillation of autovaccine.** Rev. Cubana de Oto-Neuro-Oft., 1933, v. 2, Sept.-Oct., p. 262.

The Mario Esteban treatment (see American Journal of Ophthalmology, 1933, v. 16, p. 458) is summarized and recommended as the equal of any other in efficacy. M. Davidson.

Petrunia, C. P. **Treatment of trachoma by repeated expression.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 1, p. 70.

Basing her opinion on 233 patients, the author considers repeated expression the best procedure for palpebral trachoma. Under local anesthesia the follicles are expressed with fingers or forceps, and the process is repeated every month or two until the conjunctiva is normal. Eighty-four percent were cured with two treatments, a few required as many as five.

Ray K. Daily.

Powell, B. J., Jr. **Uniocular conjunctivitis from peat dust.** Amer. Jour. Ophth., 1934, v. 17, March, pp. 206-208.

Renedo, J. M., and Gonzalvez, F. R. **Hard chancre of bulbar conjunctiva.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, Nov.-Dec., p. 286.

Fifteen days after attempted removal of a suppositious foreign body with the point of a handkerchief by the daughter of the patient, a woman of fifty-five years, an ulcer developed on the lower bulbar conjunctiva. Scrapings showed spirochetes, although the Wassermann was negative. Specific treatment caused complete disappearance.

M. Davidson.

Schousboë. **Notions on the epidemiology of infantile trachoma as drawn from the study of graphs.** Rev. Internat. du Trachoma, 1934, v. 11, Jan., p. 19.

Schousboë illustrates with graphs the incidence of trachomatous infection in different age groups. He reaches the following conclusions: (1) trachomatous infection occurs in the first few months of life (45 percent at 24 months) through the mother or members of the immediate family. Familial contamination varies proportionally with the economic condition of the household. (2) This contamination continues during early childhood and is augmented by extrafamilial contamination, in which the school plays a minor and the street the major part. Phillips Thygeson.

Selfa, E. **Citrate of copper in the treatment of trachoma.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, Dec., p. 704.

The trachoma granules are the effect and not the cause, and treatment should therefore be directed against the superimposed conjunctivitis and toward modification of the soil. This is accomplished by vitamins and intravenous injections of copper citrate, dissolved with the aid of sodium citrate (strength not stated). Of 29 cases thus treated, 65.51 percent gave favorable results. The effects were limited to the pannus, ptosis, ulcerations, lacrimation, and photophobia, and did not extend to the follicles. The copper citrate treatment is contraindicated in the presence of hepatic and gastrointestinal disturbances.
M. Davidson.

Shainfein, M. **Surgery of pterygium.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 3, p. 309.

The author illustrates a new surgical procedure, the advantage of which, he maintains, lies in the fact that the bloodvessels of the pterygium are directed toward the canthus and away from the cornea. The pterygium is separated from the cornea and for 2 mm. beyond the limbus. It is split horizontally and each half turned under and sutured, so that the pterygium is transplanted under the conjunctiva and directed toward the canthus.
Ray K. Daily.

Torres, A. **Treatment of vernal conjunctivitis.** Rev. Cubana Oto-Neuro-Oft., 1933, v. 2, Nov.-Dec., p. 277.

On the basis of a study of thirty-seven cases, the etiology is considered tuberculous or scrofulous. No local treatment, either medical or surgical, beyond cauterization of vegetations when very large, has proved of any value, and collyria have proved harmful. Only general treatment, with codliver oil, calcium, arsenic, iodides, and rest, has been of benefit. Under this treatment twenty of the cases were cured in two seasons, and eleven in three seasons; the rest being in their first season of treatment. M. Davidson.

Uudelt, J. **On the pathogenesis of trachoma.** Zeit. f. Augenh., 1934, v. 82, Feb., p. 277.

Trachoma is a follicular inflammation of the conjunctiva which in its early stages is proliferative and later destructive. Other folliculoses which do not possess all these characteristics must be differentiated from trachoma. An important element in the pathogenesis of trachoma is a lymphatic constitution not in the macroanatomic sense of bodily proportion but as a characteristic of microscopic structure and function of the tissues. The direct causative agent is as yet unknown.
F. H. Haessler.

6. CORNEA AND SCLERA

Barg, T. **The use of carbolic acid crystals in ulcers of the cornea.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 1, p. 73.

Having treated seven cases of serpiginous ulcer with hypopyon by cauterization with carbolic acid, the author concludes that it exerts a strong bactericidal effect with minimum destruction of tissue, hastens healing, and through its anesthetic action relieves pain. Its deep penetration is valued.
Ray K. Daily.

Benedict, W. L. **Excision of corneal leucoma.** Arch. of Ophth., 1934, v. 11, Jan., pp. 32-41.

Excision of the anterior layers is not indicated in a cornea which is very vascular or in which the scar tissue extends through all the layers. Seventeen cases are reported in which excision was done; one case for congenital leucoma, five cases for multiple foreign bodies superficially buried in the cornea, two for scars from burns, and nine for leucoma from recurrent corneal ulcers. Resection of a large quadrilateral area is recommended. Since the remaining cornea is invariably cloudy, the results are chiefly cosmetic. However the slight improvement in vision obtained in a few suitable cases brought great satisfaction to the patients.

J. Hewitt Judd.

Busacca, Archimede. **Trachoma of the cornea in the stage of epitheliosis and in that of pannus.** Folia Ophth. Orientalia, 1933, v. 1, July-Sept., p. 273.

The essential lesions which are present in the avascular keratitis of early trachoma are edema of the epithelium, with degeneration of certain elements, and polymorphonuclear infiltration. Bowman's membrane is often infiltrated and destroyed. Certain epithelial cells show intracellular bodies which are characteristic of viruses such as herpes and vaccinia. The author assumes that there is a primary and direct localization of the trachoma virus in the corneal epithelium. He concludes that the polyblastic infiltration is secondary to new formation of vessels and that the cells having the appearance of lymphocytes do not originate from the blood but are of histiocytic origin. The cellular accumulations in the cornea do not have centers of epithelioid cells as occur in true follicles. Pannus should be interpreted as a special granulation tissue which has formed as a defense reaction of a normally avascular tissue.

Phillips Thygeson.

Chirkovskii, B., and Dimshitz, L. **Biomicroscopic studies of true corneal trachoma.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 1, p. 27.

Following a review of the literature four cases of pannus are reported, with photographs of the slitlamp appearance and photomicrographs of the histopathologic picture. The tissue for biopsy consisted of the superficial portion of the cornea with pannus, and 3 mm. of adjacent conjunctiva and episclera. The illustrations show that typical trachomatous follicles occur in the scleral conjunctiva and in the cornea proper. Under slitlamp microscopy the corneal follicles appear as round, greyish, homogeneous, semitransparent structures, rising above the corneal surface, and surrounded by a vascular network. Microscopically they consist of the cellular elements found in the conjunctival trachoma follicle. The follicles in the cornea were found in all stages of trachoma, most frequently however in the stage of regression. These observations support the conception of pannus as a localization of the specific trachomatous process in the cornea, as against the view that it is a superficial vascular keratitis.

Ray K. Daily.

Egorow, Ilja. **Nerve elements of the cornea in the guinea-pig's eye.** Graefe's Arch., 1934, v. 131, p. 531.

Vital staining with methylene-blue in over seventy guinea-pigs showed typical encapsulated endings in the conjunctiva in the region of the transition of the sclera into the cornea and in its vascular zone. Typical sensitive end-platelets and branched endings were found in the substantia propria of the cornea. In the corneal epithelium were free endings of a special kind, resembling end bodies. Eimer's apparatus was found in large numbers in the central part of the cornea.

H. D. Lamb.

Filatov, B. **A new trephine for partial corneal transplantation.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 1, p. 12.

The device consists of a handle holding a corneal trephine and an ivory plate so that, with the ivory plate in the anterior chamber and the trephine on the corneal surface, the ivory plate protects the lens from injury by the trephine and holds back the vitreous. (Illustration.)

Ray K. Daily.

Filatov, B. **Technique of partial corneal transplantation.** Sovietski Viestnik Opht., 1934, v. 4, pt. 1, p. 3.

To avoid injuring the lens with the corneal trephine, the author introduces three superficial corneal sutures around the area to be trephined. Tension on these sutures lifts the cornea away from the lens. (Illustration.)

Ray K. Daily.

Filatov, B., and Velter, C. **Further reports on transplantation of the cornea.** Sovietskii Viestnik Opht., 1933, v. 4, pt. 1, p. 6.

Five cases observed from eleven to thirteen months are reported. All transplants remained transparent. In three corneas opaque from interstitial keratitis the results were brilliant; vision rose from counting of fingers to 0.7, 0.4, and 0.2 respectively. Two opacities were traumatic; in one vision rose from 1/60 to 1/10; in the other vision was not improved because of a dense opacity behind the transparent transplant. (Photographs.)

Ray K. Daily.

Fontana, G. **A case of bullous keratitis.** Boll. d'Ocul., 1933, v. 12, May, pp. 474-479.

A woman of twenty-two years, sufering for seven months from luetic iridocyclitis, had an opacity of the left cornea on whose upper extremity were two small bullae containing clear fluid. Cornea sensibility was decreased and the anterior chamber deep. Under treatment local and general symptoms disappeared. The writer associates the corneal condition with the iridocyclitis and disturbance of lymphatic flow of the eye, assuming that the fluid penetrated the cornea and accumulated between the epithelium and Bowman's membrane. (Bibliography and one figure.)

M. Lombardo.

Galante, E. **Experimental researches on corneal grafts.** Ann. di Ottal., 1934, v. 62, Feb., p. 119.

Grafts were employed in a dozen dogs and rabbits, the tissue from six dogs' eyes being inserted in the eyes of an equal number of rabbits and vice versa. The segments were removed with a Hippel trephine through the entire thickness of the cornea from epithelium to endothelium, a three percent solution of peptone in normal physiologic solution being introduced beneath the conjunctiva of the animal from which the segment was taken, and also used to irrigate the recipient graft. This was to stimulate development of epithelial fibroblasts. The insets quickly regained their sensibility and conserved a notable degree of transparency, which became gradually more complete. (Bibliography, four plates showing placido reflections.)

Park Lewis.

Moreu, A., and Prior, A. **Diagnosis and treatment of tuberculous parenchymatous keratitis.** Arch. de Oft. Hisp.-Amer., 1934, v. 34, Jan., p. 1.

The whole subject is reviewed at length, and the following conclusions are arrived at. Diagnostic signs are: absence of evidence of hereditary or acquired lues, presence of tuberculous stigmata, a positive Samogloff reaction (hypotension and focal reaction) to tuberculin, positive local and general tuberculin reactions, greater involvement of uvea and sclera, presence of retinal angiopathies, conjunctival lymphatic reaction, yellow-white infiltrates around nodules with involvement of endothelium, monocular involvement, tendency to fibrosis, and therapeutic results. The initial lesion is considered to be in Descemet's membrane, and abundance of aqueous exudates, best demonstrated by preliminary ingestion of fluorescein, is considered characteristic. Therapeutic recommendations include phototherapy, liver therapy, and above all gold salts, intramuscularly and subconjunctivally. Relapses have been noted after tuberculin, but none after gold salts. Twelve cases are reported in detail. (Illustrations.)

M. Davidson.

Opadovskaia, E., and Velter, L. **Fixation of the corneal transplant.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 1, p. 8.

This is the report of a laboratory investigation relative to various pro-

cedures for fixation of corneal transplants. The experiments were performed on twelve guinea pigs in six of which the fixation device operated for twenty-four hours, and in the other six, forty-eight hours. The authors' conclusions are that every fixation procedure has a traumatic effect on the surface of the transplant; but that least traumatism is produced by Filatov's method of fixation, in which a strip of conjunctiva is applied with its epithelial surface to the transplant. The fixation should be removed after twenty-four hours. Microscopic examination of transplants held by fixation sutures, conjunctival flaps, and celluloid strips for forty-eight hours showed a decided advance in the traumatic process, and the traumatism of this procedure is one of the factors in subsequent opacification of the transplant. Ray K. Daily.

Sapir, T. **Tattooing of corneal opacities with gold chloride.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 1, p. 41.

The results of 290 operations are reported; and four cases complicated with iridocyclitis leading to atrophy of the globe are reported in detail. The procedure is simple in execution, and usually satisfactory in its results. Its negative points are inability to determine in advance the final color, tendency of the stain to fade in some cases, and the danger of setting up severe inflammatory process in eyes which had remained quiet for years.

Ray K. Daily.

Thomas, J. W. T. **Observations on some matters associated with experimental corneal grafting.** Brit. Jour. Ophth., 1934, v. 18, March, p. 129.

In previous experiments the author has shown that corneal tissue grafts of whole thickness can be transplanted from one rabbit to another and remain transparent. The present contribution compares results of further homogeneous and heterogeneous grafts. The prevention of iris adhesion and the sensitiveness of corneal grafts are discussed. A summary of both series of homogeneous grafts shows the following results: Ten were transparent, one had a clear area, one was nebulous with a clear area, three were opaque, and one became partly detached. Of five heterogeneous grafts, one human and four from cats, all became united, but none was clear. In only one was there a suggestion of transparency. Homogeneous grafts which unite well remain clear and avascular when a particular technique is followed. A graft about 4.5 mm. in diameter is used, with a sloping edge held in position by "cross stitching." Water-tight union is obtained, and reestablishment of the anterior chamber is assured. Formation of fibrin about the sutures is prevented by use of a citrated saline solution. (Thirteen illustrations.) D. F. Harbridge.

Van der Hoeve, J. **Scleromalacia perforans.** Arch. of Ophth., 1934, v. 11, Jan., pp. 111-118.

The author reports four cases of this disease entity, which he states has not been previously described. It consists in degeneration of the sclera occurring with negative bacteriologic findings, and resulting in development of holes of varying size in the sclera, over which the conjunctiva may be present, atrophic, or absent. It is often accompanied by polyarthritis. Secondary clouding of the cornea and uveitis may ensue. It is more prevalent in middle and old age, has a slow onset and long duration. The holes are not restricted to any special part of the sclera. (Drawings and photographs.)

J. Hewitt Judd.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Andrade, Lopes de. **Experiments on the influence of injuries of the eye on localization of focal phenomena from tubercle bacilli introduced into the blood stream, and remarks on the question of sympathetic ophthalmia.** Klin. M. f. Augenh., 1934, v. 92, March, p. 350. (Ill.)

Under narcosis the right eyes of thirty-eight rabbits were freely scarified in the ciliary region, and immediately or from six to twenty-four hours later intravenous injections of tubercle bacilli were given. The left

eyes were left intact for control. Fifteen animals showed positive, twenty-three negative results, indicating that injuries of the ciliary region had a marked but numerically not a predominant influence on the localization of tuberculosis in the injured eye. Out of the fifteen positive cases the injured right eye was affected fourteen times, the intact left eye nine times. Without exception the process in the injured right eye was much more intense than in the uninjured left eye. Disease of the injured eye is not a prerequisite for participation of the uninjured eye. While the clinical and histological changes were in every case characteristic of true tuberculosis, the experiments gave no indication that human sympathetic ophthalmia might be due to tuberculosis. C. Zimmermann.

Franta, Jiri. **Penetration of the fluorescein in the anterior chamber of the normal and the pathological eye.** Ceskoslovenska Ofthalmologie, 1933, v. 1, no. 2. pp. 76-86.

Using a slitlamp, filtration of fluorescein into the anterior chamber was observed in thirty-two normal and pathologic eyes. Two c.c. of ten percent sodium-fluorescein was injected subcutaneously. Progress was graphically recorded colorimetrically to show the length of time of various degrees of coloring of the aqueous. In normal eyes the first traces of coloring appeared within 50 to 60 minutes, distinct coloring after 60 minutes. In eyes with optic-nerve or retinal changes, the time of appearance of fluorescein was normal. In uveitis the appearance of fluorescein was noticeably accelerated, the first signs of coloration being recorded in 5 to 30, distinct coloration in 30 to 40, and intense coloration in 20 to 50 minutes. In congenital uveal changes (for example, aniridial) the appearance of fluorescein was delayed. In a case of primary glaucoma acceleration was observed, somewhat less than in uveitis. In nine out of ten retinal detachments a rather strong acceleration was observed, the first traces of coloration in 15 to 30, distinct coloration in 30 to 40, and intense coloration in 40 to 60 minutes. In retinal detachment of traumatic and inflammatory origin, the acceleration was greater than in myopic detachment. In reattachment following operation, delayed appearance of fluorescein was observed, although somewhat more accelerated than in the normal eye. In almost all patients with detachment the normal eye showed accelerated filtration. G. D. Theobald.

Igersheimer, J. **Pathology of tuberculosis of the anterior uvea.** Arch. of Ophth., 1934, v. 11, Jan., pp. 119-132.

This study is based on cases reported in the literature in which a histologic examination was made, together with fifteen cases observed personally. Clinically the cases are separated into three groups: (1) acute and subacute. (2) chronic and recurrent, (3) special types. The characteristics of each are outlined and well illustrated by photomicrographs. Studies of sixty-seven cases according to age showed a much greater incidence of caseation or necrosis, hypopyon, and perforation of the globe in the first decade, indicating greater hypersensitivity expressed by abundant exudation with or without caseation. As immunity increases there is greater cellular productivity. Histologic examination not only explains pathogenesis but adds valuable information as to prognosis and therapy.
J. Hewitt Judd.

Majoros, J. **The action of intravenous sodium salicylate in eye disease.** Zeit. f. Augenh., 1934, v. 83, March, p. 16.

The author gives not less than one gram and usually two grams of sodium salicylate in ten percent solution intravenously, as much as three times daily but not for longer than one week. A rise of temperature usually follows the injection. Albuminuria is rare. The author gives his experience with eighteen patients afflicted with iritis and cyclitis. Severest pain is dulled and usually disappears in a few minutes after the injection. The pupil dilates more readily and the aqueous becomes clearer. The injections are also effective in controlling pain in glaucoma.
F. H. Haessler.

Mann, Ida. **Persistence of capsulopupillary vessels as a factor in the production of abnormalities of the iris and lens.** Arch. of Ophth., 1934, v. 11, Jan., pp. 174-182.

Six cases are described illustrating some of the various types of anomaly which are produced by overdevelopment or undue persistence of the capsulopupillary vessels alone, together with the embryologic explanation of the findings in each. The author points out that the persisting vessel may occur in any situation and may produce a gap or notch in either the ectodermal or the mesodermal portion of the iris or in both. Remnants of the pupillary membrane are present. Usually there is a gap in the zonule and a notch in the margin of the lens, and often an opacity of the lens in the region of the coloboma. In some cases a persisting vessel may be seen, but usually it has atrophied after producing the anomalies. (Drawings.) J. Hewitt Judd.

Moreu, A. **Treatment of tuberculous iridocyclitis by anterior chamber autohemotherapy.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, Dec., p. 699.

Schieck's method was applied to two cases with excellent results: disappearance of precipitates, clearing of vitreous, and recovery of vision from counting fingers to 20/20 in one and 20/40 in the other, after four injections in the course of six weeks. The second case was complicated by pustuliform keratitis. The blood disappeared from the anterior chamber in five days. The injection in the first case was done with a needle, in the second with a canula after paracentesis. The latter method was found more convenient and no escape of blood was observed after it.

M. Davidson.

Pacalin, G. **The use of atropin and paracentesis in the treatment of iridocyclitis with intraocular hypertension.** Ann. d'Ocul., 1934, v. 171, March, pp. 237-244.

The cause was believed to be dental. Miotics were used without success. Atropin was substituted and the glaucoma was controlled by ten corneal punctures. H. Rommel Hildreth.

Pagès, R. **Iridocyclitis during the course of amebic dysentery.** Folia Ophth. Orientalia, 1933, v. 1, July-Sept., p. 305.

The author describes a case of amebic dysentery in which each flare-up of the disease was accompanied by iridocyclitis with hypopyon. Treatment with emetin and yatren 105 resulted in cure of both conditions. The author believes the iridocyclitis was of amebic nature.

Phillips Thygeson.

Panico, E. **Concretions of the lamina vitrea of the choroid.** Boll. d'Ocul., 1933, v. 12, May, pp. 411-429.

Concretions of the lamina vitrea were found in eleven eyes which had been enucleated for atrophy of the eyeball, epithelioma or melanosarcoma of the limbus, severe infection of the cornea, or iris cyst. They were formed of hyaline and granular substance and lined by layers of degenerated cells of retinal epithelium. (Bibliography.)

M. Lombardo.

Rieger, Herwigh. **Contribution to the knowledge of rare maldevelopments of the iris. 1. Membrana iridopupillaris persistens.** Graefe's Arch., 1934, v. 131, p. 523.

In each eye of a woman of twenty-eight years were glassy gray strings arising partly from the chamber angle and partly from the anterior surface of the iris, and extending to the posterior surface of the periphery of the cornea, where they ended in part as nodular thickenings and partly as a delicate glassy membranous layer. The iris gave the impression of being split into two separate layers. Each lens showed a shield-shaped opacity with central prominence at the position of the anterior embryonal suture, while behind the central interval a triradiate, richly plumed or feather-crested cataract occurred. H. D. Lamb.

8. GLAUCOMA AND OCULAR TENSION

Duke-Elder, W. S., and Duke-Elder, P. M. **Etiology of glaucoma.** Arch. of Ophth., 1934, v. 11, Jan., pp. 49-57.

The apparatus for raising intraocular pressure and producing a vascular

crisis in the eye is described. Experimental evidence is presented to show that stroking the iris with a cannula inserted into the eye produced a reaction similar to the "triple response" of Lewis in the skin; local dilatation of small vessels, increased permeability, and widespread vasodilatation or flare. Maximal miosis and increase in intraocular pressure also occurred. Liberation of a histamin-like substance in the eye may cause the acute vascular crisis in association with increased permeability of the intraocular vessels and with the rise of pressure which characterizes acute glaucoma.

J. Hewitt Judd.

Herbert, H. **Supplementary note on iris inclusion for chronic glaucoma.** Brit. Jour. Ophth., 1934, v. 18, March, p. 142.

The author offers three important suggestions from his experience. Uncut iris prolapse rather remotely favors dangerous leaking in over-stretched tissue undergoing fibrosis. Straight radial iris division assures permanent relief of tension. Reliable fibrosis is secured by addition of a measured iridodialysis. Clinical observation indicates that the new tissue is of conjunctival origin, the proliferative stimulus coming from mildly irritative products of broken-down displaced iris tissue.

D. F. Harbridge.

Karasek, O. **Prolapse of the retina into the anterior chamber after Elliot's trephining in congenital hydrophthalmos.** Klin. M. f. Augenh., 1934, v. 92, March, p. 389.

After trephining a very large hydrophthalmic eye in a girl of seven years, total detachment of the retina and prolapse of a retinal fold into the anterior chamber occurred through a gap between the margin of the lens and the ciliary body, in consequence of too sudden evacuation of aqueous and of liquified vitreous. Subluxation of the lens, found afterward with the slitlamp, must at least partly have existed before operation, being attributable to enormous distension of the globe and rupture of the zonula, as indicated by tremulousness of the iris observed previous to operation. Two months later no prolapse was visible, the retinal fold having apparently retracted behind the lens. The whole retina, however, was detached, yet a tear could not be seen.

C. Zimmermann.

Malkin, B. **On orbital injections of alcohol.** Zeit. f. Augenh., 1934, v. 82, Feb., p. 286.

Retrobulbar injection of alcohol is an easy method of controlling pain. Through a platinum needle four centimeters long one c.c. of a two percent solution of novocaine with adrenalin is injected and the needle is left in place. Eight to ten minutes later one to three cubic centimeters of alcohol are injected. In the blind eye eighty percent alcohol is used, when there is still some vision, forty percent alcohol. The initial pain caused by the alcohol may be controlled with morphine. The muscle paralyses produced by the alcohol are transient, though ptosis may last for three months. F. H. Haessler.

Mussabeili, U. **Pathologic anatomy of buphthalmos.** Zeit. f. Augenh., 1934, v. 83, March, p. 27.

Buphthalmos or secondary infantile glaucoma, as distinguished from congenital hydrophthalmos or primary infantile glaucoma, is characterized not only by a dilatation of the whole eyeball but by giant growth of its various parts and tissues. In the case studied by the author a fibroma keloid developed, which he considers a reaction to the increased intraocular pressure. The tectonic processes in the eyeball do not cease with development of the staphyloma. F. H. Haessler.

Post, L. T. **Levoglaucosan and epinephrin bitartrate in the treatment of glaucoma.** Arch. of Ophth., 1934, v. 11, Jan., pp. 187-193.

The author reports eleven cases which illustrate the importance of these drugs as aids in the nonoperative treatment of chronic simple glaucoma. He finds that they are of little value in secondary glaucoma, and of no value in acute glaucoma. Epinephrin bitartrate gave as good results as levoglaucosan, and it is cheaper and more easily ap-

plied. Amin-glaucosan was used in one case and caused such a reaction that the author has not repeated its use.

J. Hewitt Judd.

Rollin, A. **Biomicroscopy of the limbus network.** Arch. d'Opht., 1934, v. 51, Feb., p. 102.

By means of two color plates and a diagram the description of the limbus vessels and lymphatics as they appear under the biomicroscope is clarified. This region is regarded as the site of communication between the anterior chamber and the surface conjunctiva. In acute glaucoma the vessels in this network are congested, but in chronic glaucoma there seems to be a perilimbal vascular sclerosis. Instillation of adrenalin appears to dilate the lymphatics, with outpouring of lymph.

M. F. Weymann.

Rycroft, B. W. **The relationship of histamin and the intraocular pressure.** Brit. Jour. Ophth., 1934, v. 18, March, p. 149.

The problems investigated were the effect of histamin on the intraocular pressure of the normal eye and in the indentification of histamin in the aqueous in cases of acute glaucoma. The general properties of histamin are discussed, and its effects on the salivary glands, stomach, blood vessels, skin, muscles, and eye. The effects vary according to species. Injection into the eye of a cat will produce a rise of intraocular pressure independent of that due to its own volume. The presence of a vasotoxic substance in the aqueous in cases of acute glaucoma is indicated.

D. F. Harbridge.

Sondermann, R. **My glaucoma theory and clinical experience of glaucoma.** Klin. M. f. Augenh., 1934, v. 92, March, p. 313.

Glaucoma is considered as an ophthalmosclerosis. The ocular tension is determined by four factors: pressure in the capillaries of the uvea, osmotic blood pressure, production and drainage of the aqueous. In senile eyes, in consequence of increased congestion and pressure on the vortex veins by sclerosis of the sclera, increased formation and drainage of aqueous must follow. The author discusses the employment of the fluorescein test in diagnosing the preliminary stages of glaucoma and in controlling operative results. New formation of bloodvessels may contribute to the operative results.

C. Zimmermann.

Towbin, B. G., Protopopow, B. W., and Urnishewskaja, W. S. **The effect of operative intervention in one eye upon the intraocular tension of the other eye.** Graefe's Arch., 1934, v. 131, p. 554.

Of ninety-one cases in which an operation, extraction of cataract, preliminary iridectomy, discission, removal of capsule or cataract remains, enucleation, extirpation of the lacrimal sac, iridectomy for glaucoma, or other operation, was performed on one eye, in fifty-eight a corresponding change was produced in the tension of the fellow eye.

H. D. Lamb.

9. CRYSTALLINE LENS

Amstislavskii, L. **Pflüger-Hess cataract extraction and prophylaxis against iris prolapse.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 1, p. 20.

The statistics of the Odessa Medical Institute are used to show the effectiveness of peripheral iridectomy in preventing prolapse of the iris. Of 201 simple extractions iris prolapse occurred in 13.5 percent. In 193 subsequent cases peripheral iridectomy reduced iris prolapse to 0.5 percent.

Ray K. Daily.

De Grosz, E. **Extraction of cataracts.** Arch. of Ophth., 1934, v. 11, Jan., pp. 102-110.

The author describes the instruments (illustrated), his technique of extracapsular and intracapsular extraction, and the preoperative and after treatment as followed in his clinic in the University of Budapest, where during the past thirty years 14,000 operations for senile cataract were performed. At the present time a general attempt is being made to remove the lens in capsule, with success in about sixty per-

cent. The incidence of vitreous loss is only 1.8 to 1.5 percent greater than with the extracapsular method. The incidence of infection and of loss of vitreous is decreasing because of improved technique which now includes retrobulbar injection, akinesia, and superior rectus fixation. J. Hewitt Judd.

Ellett, E. C. **Cataract and tetany following parathyroid disturbance.** Arch. of Ophth., 1934, v. 11, Jan., pp. 49-57.

Two cases are reported in which tetany cataract developed after operations for goiter. In a woman aged forty-four years, who developed severe tetany, posterior cortical cataracts formed and were removed with respective vision of 5/6 and 5/7.5. A tendency to spontaneous intraocular hemorrhage was present in the left eye. A woman of twenty-two years, after three operations for goiter, developed tetany and zonular cataracts. These were removed with vision of 6/6 in each eye.
J. Hewitt Judd.

Elschnig, A. **Intracapsular extraction in highly myopic eyes.** Arch. of Ophth., 1934, v. 11, Jan., pp. 64-66.

The author reviews his method of extraction and points out that, although there is greater danger of vitreous prolapse, the results with the safety procedures used are no worse than in emmetropic or hypermetropic eyes. The results in 136 cases are reported and compared with 258 cases in which extracapsular extraction was done. This comparison shows the intracapsular to be superior with respect to all complications. J. Hewitt Judd.

Garcia Miranda, A. **Contribution to study of ocular lesions due to naphthalin.** Arch. de Oft. Hisp.-Amer., 1934, v. 34, Feb., p. 76.

The writer finds that the retinal lesions appear within six hours, beginning in the periphery, that crystals form in the vitreous, presumed to be cholesterin, in from six to twelve days, and that opacification of the lens occurs much later. No changes indicative of iridocyclitis were noted. Blood studies showed no definite disturbance of metabolism of sugar, nitrogen, calcium, or cholesterin. From study of the urine the toxic agent cannot be identified. Naphthalin cataract is considered as secondary to the retinochoroidal lesions and therefore as cataracta complicata. M. Davidson.

Gradle, H. S. **Intracapsular versus extracapsular extraction of cataract.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1933, p. 186.

Comparison of the results of two hundred consecutive extractions of cataract, one-half by the Elschnig intracapsular method, and one-half by the extracapsular or capsulotomy method, shows but few differences, except in the matter of secondary needlings and in vitreous losses. Here the percentage is markedly in favor of the intracapsular method. The ideal cataract operation of today is Elschnig intracapsular extraction with a round pupil, but this operation is not for the casual operator. Less irritation follows the intracapsular method, and the healing process is more rapid. (Nine tables, and discussion.) George H. Stine.

Kaminskaja-Pavlova, A. **Some sequelae of intracapsular extraction.** Sovietskii Viestnik Opht., 1933, v. 4, pt. 1, p. 14.

Fifty-five cases of intracapsular extraction were subjected by the writer to slitlamp examination during their hospitalization period. All had folds in Descemet's membrane, edema and partial absence of the corneal endothelium, and edema of the corneal stroma. In fifty percent the anterior chamber was filled with a fine pigment dust. Where a good deal of vitreous protruded into the anterior chamber its albumen stopped the normal currents in the anterior chamber. Occasionally in apparently complete intracapsular extractions fine capsular tags were seen in the wound. In the first postoperative days, hemorrhages in the vitreous and on its surface were seen frequently; vitreous opacities in the form of fine threads or fine dust were frequent; and the vitreous in the anterior chamber was invaded by pigment. The writer at-

tributes the corneal and pigment changes to mechanical traumatism to the cornea and iris by the tumbling lens. Ray K. Daily.

Killmann. **Congenital bilateral lens ectopia and arachnodactylia.** Klin. M. f. Augenh., 1934, v. 92, March, p. 335. (Ill.)

Seven cases of typical arachnodactylia and one atypical, in two females and six males, are described. The general symptoms consisted in high stature, dolichocephalus, long face, long chin in one, curvature of the spine in four, long hands and feet in all, drop foot and flexor contractures of the long fingers and toes in two, and congenital heart trouble. Muscles and adipose tissue were poorly developed in the majority. All had congenital bilateral lens ectopia, four concomitant squint, one atrophy of the stroma and the pigment layer of the iris, three changes in the fundi. Examinations of metabolism in three patients excluded hypophyseal affections, and roentgen rays showed no changes in size and structure of the sella turcica. Dominant hereditary transmission was objectively established in two and surmised in three patients. Lues, alcoholism or consanguinity could not be proved.

C. Zimmermann.

Kirby, D. B. **Cataract instrument with cylindric handle and better blades.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1933, p. 309.

These matched cataract instruments were demonstrated by the author five years ago. Since then better blades have been devised. George H. Stine.

Mann, Ida. **Persistence of capsulopupillary vessels as a factor in the production of abnormalities of iris and lens.** Arch. of Ophth., 1934, v. 11, Jan., pp. 174-182. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Mayer, L. L., and Luhan, J. A. **Myotonia atrophica with cataract; report of three cases.** Arch. of Neur. and Psych., 1933, v. 30, Oct., p. 810.

The literature and the three case reports are written up in detail. The authors regard myotonia atrophica as a distinct nosologic entity characterized by myotonia, muscular atrophy of selective distribution, and dystrophic extramuscular phenomena, chief among which is a distinctive form of presenile cataract. The disease is probably heredofamilial, usually begins between the ages of eighteen and thirty-five years, and predominantly affects males. Certain recent observers have stressed a diminished calcium content of the blood, signs of latent tetany, and the cataract itself as implicating parathyroid insufficiency. (Fifty-seven references.) Ralph W. Danielson.

Meesmann, A. **Clinical observations of glassmaker's cataracts and their relation to other types of cataract.** Klin. M. f. Augenh., 1934, v. 92, March, p. 289. (Ill.)

Meesmann emphasizes that senile cataracts of the nucleus and cortex are not to be considered as consequences of capsular exfoliation, nor posterior polar opacity or the radial dotted infiltrations as preliminary stages of senile cataract. Sclerosis of the nucleus and senile opacities of the lens are much rather a clear expression of biologic senescence and senile decay of the lens which create a predisposition to lesions from the furnace radiations.

C. Zimmermann.

Neuman, J. **Lentiglobus posterior.** Klinika Oczna, 1933, v. 11, pt. 4, p. 384.

Following the report of a case in an eight-year-old boy, the author suggests that since slitlamp microscopy shows the protrusion on the posterior surface of the lens to be globular and not conical in form the term lenticonus should be changed to lentiglobus. He attributes the pathogenesis of lentiglobus to occlusion of the branch of the hyaloid artery which nourishes the posterior pole of the lens, leading to softening and protrusion of the lens substance.

Ray K. Daily.

Nordmann, Jean. **The present known facts concerning the problem of cata-**

ract. Arch. d'Opht., 1934, v. 51, Feb., p. 76.

This is a very complete summary of the research done and facts known concerning the problem of cataract up to January, 1934. More research needs to be done upon cataractous lenses to compare the findings with those upon normal lenses. M. F. Weymann.

Nugent, O. B. **Cataract complications in relation to intraocular tension and blood pressure. A study of 2,200 cataract extractions.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1933, p. 220.

In this analysis it appears that the intraocular tension is a better sign to indicate oncoming trouble than a study of the blood pressure. In choroidal hemorrhages the average intraocular tension was found to be increased while the blood pressure was below the average. The intraocular tension is not dependent on the blood pressure. Routine tonometry and blood pressure measurement before operation are of great importance. (Two tables and discussion.) George H. Stine.

Nugent, O. B. **Oral vacuum control valve and modified Green's suction cup.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1933, p. 307.

With this oral vacuum control valve the Barraquer erisiphake is unnecessary, and the foot control of the Green cup is replaced by a valve cup to be placed in the operator's mouth where touching the tongue to the valve stops the flow of air through the valve and creates the vacuum. The danger of untoward movement of the operator's hand or body is in this way eliminated. (One illustration.)

George H. Stine.

Parker, W. R. **Comparative results in the extraction of senile cataracts,** using the combined, simple, and Knapp-Török intracapsular methods. Arch. of Ophth., 1934, v. 11, Jan., pp. 183-186.

This is a report of a study of comparative results obtained by the combined, simple, and intracapsular methods of cataract extraction, in 150 cases each. The combined method was used in private cases, the simple in both private and clinic cases, and the intracapsular in clinic cases. The results are tabulated as to vision, complications, pathologic conditions, and secondary cataracts. The combined method showed a lower percentage of complications and a higher percentage of good visual results. J. Hewitt Judd.

Pischel, D. K. **Comparative end results in the intracapsular and extracapsular operations for the removal of senile cataracts.** Amer. Jour. Ophth., 1934, v. 17, April, pp. 326-333.

Schnyder, W. F. **The body temperature of furnace men in a rolling mill.** Graefe's Arch., 1934, v. 131, p. 611.

Temperatures taken by rectum in ten furnace men showed an average increase of temperature of 0.6°C., after exposure to the heat of their work. The corresponding amount reported by Goldmann was 1.35°C. There is therefore no basis for considering industrial hyperthermia as causing heat cataract.

H. D. Lamb.

10. RETINA AND VITREOUS

Bailliart, P. **Capillaritis and lacunar lesions of the retina.** Ann. d'Ocul., 1934, v. 171, Feb., pp. 97-126.

The author groups together a number of retinal cases of the retinitis circinata type having small punctate lesions in the region of the posterior pole. The lesions are degenerative in type, appearing under the microscope as spaces in the inner nuclear layer of the retina. It is believed that the primary disturbance is spasmodic obliteration of the capillaries. The belief is strengthened by clinical improvement following the use of acetylcholine.

H. Rommel Hildreth.

Caeiro, J. A., Malbran, J., Balza, J. **Treatment of retinitis pigmentosa by cervicothoracic sympathectomy.** Arch. de Oft. de Buenos Aires, 1933, v. 8, Nov., pp. 508-520.

The authors have treated five cases by unilateral cervicothoracic sympathectomy. They report that in all of the cases vision was improved after the

operation, in some of them to a considerable degree, although the pathologic changes were advanced.

R. Castroviejo.

Gil, R. R., Adrogue, E., and Courtis, B. **Some ophthalmoscopic changes in general hypertension.** Arch. de Oft. de Buenos Aires, 1933, v. 8, Nov., pp. 521-530.

The authors discuss briefly some of the changes found in the vessels of the fundus in cases of increased general blood pressure with or without generalized arteriosclerosis. (Three photographs.) R. Castroviejo.

Gresser, E. B. **A modified electrodiathermic technique for retinal detachment.** Amer. Jour. Ophth., 1934, v. 17, April, pp. 340-344.

Hulla and Masek. **Study of capillaries in detachment of the retina.** Ceskoslovenska Ofthalmologie, 1933, v. 1, no. 2, pp. 72-76.

In nineteen cases of detached retina the capillaries were studied according to Lombard's method. Thirteen cases showed marked vasoneurotic changes. In four cases the changes were not quite convincing and in two cases the capillaries showed no changes. The author concludes that vasoneurosis plays a very prominent part in detachment of the retina. G. D. Theobald.

Kadlicky, R. **The operative treatment of detachment of the retina.** Ceskoslovenska Ofthalmologie, 1933, v. 1, no. 2, pp. 61-65.

The author reports sixty-two operations. In the beginning he used Gonin's operation, later electrocoagulation in different ways. Operating, without selection, on all cases of detachment, he obtained a cure in 31.9 percent.

His best results were from contiguous perforated spots of coagulation delimiting the diseased part of the retina from the healthy, by means of a needle-electrode with a current of 40 to 50 ma. He thinks the tear only a symptom of the most diseased part of the retina and that the adjacent retina is also diseased. G. D. Theobald.

Kurz, Jaromir. **Two cases histologically examined after Gonin's operation.** Ceskoslovenska Ofthalmologie, 1933, v. 1, no. 2, pp. 66-71.

In the first case, the eye was enucleated three years after ignipuncture, on account of progressive atrophy of the eyeball; in the second case three months after operation, on account of a sarcoma of the choroid. These anatomical examinations show that ignipuncture is a relatively severe procedure, for it leads to formation of scar tissue around the cauterized area, and numerous connective tissue bands extend from the cauterized area radially into the vitreous. In the second eye these bands passed down through the vitreous up to the ciliary processes and the posterior surface of the lens. Such bands might later detach the retina.

G. D. Theobald.

Lindner, K. **Prevention of spontaneous retinal detachment.** Arch. of Ophth., 1934, v. 11, Jan., pp. 148-158.

To illustrate the mechanical forces which cause detachment in the presence of a flap-hole of the retina, the author describes a model consisting of a round glass flask lined with a layer of celloidin containing aluminum powder to render it visible. The flask, filled with 1 to 1.5 percent gelatin solution and rotated suddenly and stopped suddenly, demonstrates the mechanical shock which the author feels is responsible for the formation of the flap-hole by the partially detached or liquified vitreous always present in spontaneous retinal detachment. He believes that there is a reversed stream of intraocular fluid which moves from the ciliary body toward and through the retinal hole and causes the neighboring vitreous to diminish in volume and so to draw the adherent retina inward. Immobilization of the eyeball would prevent the formation of flap-holes and detachments and, while holes caused by retinal degeneration cannot be prevented, the beginning of the detachment can be prevented by immobilization. Stenopaic spectacles are suggested as a practical way to limit motion.

J. Hewitt Judd.

McKee, S. H. **Observations on the fundus oculi in diabetes mellitus.** Canadian Med. Assoc. Jour., 1933, v. 24, Nov., p. 520.

The author admits that there is a marked similarity between diabetic, renal and arteriosclerotic retinitis, but traces differential diagnosis as to patches of retinal exudate, the star figure, the shape of retinal hemorrhages, and retinal pigment spots. (Nine references.) Ralph W. Danielson.

Magitot, A. **The subretinal fluid in idiopathic detachment of the retina.** Arch. of Ophth., 1934, v. 11, Jan., pp. 159-173.

After reviewing previous chemical studies on the subretinal fluid, the author reports the results of his studies on the sugar, chloride, and albumen content in twenty-four specimens. In six cases similar determinations were made on the aqueous. The chemical composition resembles that of an exudate except that the albumen and sugar contents are higher than in blood serum. The high content of solids indicates the presence of products of cell disintegration. Such degeneration of the visual cells would explain persistent visual deficiency in otherwise successfully operated cases. The author states that when the retina has retained its glycolytic function very litle sugar is found in the retinal fluid, while if this physiologic function is lost larger amounts are present. Hence the percentage of sugar in the retinal fluid may indicate the functional state of the retina and favor more exact prognosis. (Two illustrations.) J. Hewitt Judd.

Meyerbach, Fritz. **Retinitis pigmentosa and internal secretions.** Folia Ophth. Orientalia, 1933, v. 1, July-Sept., p. 317.

Striking results were obtained with organotherapy. The progress is illustrated by visual field studies.

Phillips Thygeson.

Michail, D. **Retinal folds caused by a frontal sinus mucocele.** Ann. d'Ocul., 1934, v. 171, Feb., pp. 126-138.

A woman aged fifty-six years had had increasing exophthalmos of the left eye for about six years. The eye was pushed downward and outward and was flattened from above as shown by astigmatism and horizontal retinal folds running temporalward from the disc. After removal of the mucocele there was a slight enophthalmos. The astigmatism persisted but the retinal folds largely disappeared. In such cases the retina tends to return to normal more readily than the cornea.

H. Rommel Hildreth.

Sobanskii, J., and Szezeniowski, J. **The relation of the intraocular venous tension to intracranial pressure.** Klinika Oczna, 1933, v. 11, pt. 1, p. 369.

After cocainizing the eye and taking the tension, the pressure at which a venous pulse appeared was determined with an ophthalmodynamometer. This was followed by spinal puncture. From the findings in seventy-five cases the author concludes that the venous pulse is caused by transmission of the arterial wave by the retinal capillaries; that the venous retinal tension is related to the intracranial tension, and that the pressure at which a venous pulse appears indicates the intracranial pressure, further that in all cases of elevated intracranial pressure, with or without choked disk, the diastolic arterial retinal tension is also elevated.

Ray K. Daily.

Stine, G. H. **Tables for accurate retinal localization.** Amer. Jour. Ophth., 1934, v. 17, April, pp. 314-324.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Batrachenko, P., and Aksalonova, T. **Diathermy in the treatment of ocular diseases. Preliminary communication.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 1, p. 36.

This is a report of two cases of postneuritic atrophy improved by treatment with diathermy. (Photographs of visual fields.) Ray K. Daily.

Cormack, H. S., and Anderson, L. A. P. **Bilateral papillitis following antirabic inoculation: recovery.** Brit. Jour. Ophth., 1934, v., 18, March, p. 167.

The sight of a female aged thirty-one years had begun to be dim nine days before observation. Right vision was 6/36, left vision light perception. Each eye showed papillitis of from 1.5 to 2 diopters. Under treatment full 6/5 vision was obtained at the end of two months. The left eye showed a small scotoma. Only several weeks after discharge from the hospital was it casually discovered that sight had begun to fail five or six days after the last and twenty-two days after the first of a series of antirabic injections.

D. F. Harbridge.

Mylius, K. **A meningioma of the olfactory groove, a tumor of especial importance to the oculist.** Zeit. f. Augenh., 1934, v. 82, Feb., p. 257.

The diagnosis of this condition is based on the presence of (1) anosmia, (2) degenerative descending optic atrophy usually with central scotoma on the same side as the lesion, (3) contralateral papilledema, and (4) in later stages other frontal lobe symptoms. In differential diagnosis one must consider basal glioma, in which general tumor manifestations, headache, vertigo, vomiting, apraxia, static ataxia, and motor aphasia occur much earlier than in olfactory groove tumors. Gliosarcoma, because of its rapid growth, is less apt to cause diagnostic difficulties.

Meningioma arising in the tuberculum sellae may proliferate along the base of the frontal lobe, but usually the disturbances of smell develop after other symptoms, and pressure caused on the chiasm often produces heteronymous hemianopic field defects. Other brain tumors which cause some of the symptoms that might suggest olfactory groove meningioma, because of the pressure on the chiasm caused by dilated recesses of the third ventricle, usually cause no disturbance of smell. Roentgenograms and lumbar punctures may give some diagnostic help.

F. H. Haessler.

Prister, B. **Attempt at treatment of optic nerve atrophies.** Boll. d'Ocul., 1933, v. 12, May, pp. 480-507.

Acetylcholine, a dilator of peripheral blood vessels, has been used in spasm and obliteration of retinal vessels, chronic glaucoma, retrobulbar neuritis, and visual disturbances of central origin. The writer used it with good result in seven cases of optic atrophy, two of which were of tabetic origin. He concludes that it may be safely used intraorbitally, has low toxicity, and acts in small doses. (Bibliography.)

M. Lombardo.

Ray, N. N. **Chronic retrobulbar neuritis and amblyopias of toxic origin. A new method of treatment,** Brit. Jour. Ophth., 1934, v., 18, March, p. 170.

The treatment was used in poisoning by heavy metals and in acute infectious diseases. No cases of tobacco or quinine amblyopia were included, and the method is contraindicated in chronic retrobulbar neuritis, disseminated sclerosis, diabetes, nephritis, or syphilis, unless there is a negative Wassermann following antiluetic treatment. Long addiction to alcohol is also dangerous to use of the method. The patient is given in the gluteal region a course of six deep intramuscular injections of "contramine," 0.05 to 0.25 gm. (according to age), every forty-eight hours. The drug is an organic sulphur compound. This is followed with a mixture of glycerophosphates and strychnine. The author claims remarkable results in over 150 cases.

D. F. Harbridge.

Sawhney, M. R. **Oxycephaly in brothers.** Brit. Jour. Ophth., 1934, v., 18, March, p. 169.

Both cases presented bilateral exophthalmos and marked ptosis. The eyes were fixed in the median line, with complete inability to move in any direction. No familial evidence of the trouble was obtained. Field, vision, and fundus examinations were normal. Intelligence was normal for their class.

D. F. Harbridge.

Schweinitz, G. E. de, and DeLong, Perce. **Blindness and papilledema in Guernsey calves.** Arch. of Ophth., 1934, v. 11, Jan., pp. 194-213.

The ocular findings and complete autopsy report of this condition in a female Guernsey calf are presented. The

authors discuss the frequency, breeds affected, sex, onset of blindness, variations in the ophthalmoscopic picture of reported cases, histopathology, and importance of heredity and other etiologic factors, such as food poisoning. (Photomicrographs and photograph.)

J. Hewitt Judd.

Volfkovich, M. **Remarks on endonasal treatment in visual disorders.** Sovietskii Viestnik Opht., 1933, v. 3, pt. 1, p. 30.

In four patients with enlargement of the blind spot and normal vision, anemia of the nasal mucous membrane produced within one hour considerable diminution in the size of the blind spot; but after one to two hours the blind spot enlarged again. In three of these four cases a like contraction of the blind spot followed application of a 2 ma. galvanic current for ten minutes; the positive pole to the middle turbinate and the negative in the patient's hand. Similar effect on the enlarged blind spot was produced in a case of retrobulbar neuritis with central scotoma, diminished vision, and negative nasal findings. In a second such case anemia of the nasal mucous membrane and the galvanic current were ineffective.

The author regards his cases of retrobulbar neuritis without demonstrable nasal pathology, but which improved after surgical intervention in the nasal sinuses, as cases of reflex neurosis; the improvement being a reflex result of the nasal hemorrhage and of section of the terminal nerve endings.

Ray K. Daily.

Wirtschafter, Z. T. **Toxic amblyopia and accompanying physiological disturbances in carbon tetrachloride intoxication.** Amer. Jour. Pub. Health, 1933, v. 23, Oct., p. 1035.

Five case reports are given. This amblyopia is characterized by concentric constriction of all the color fields, without central scotomata. With cessation of exposure, and a high calcium and dextrose diet, the amblyopia rapidly disappears. Routine examination of the visual fields of workers exposed to the vapor of carbon tetrachloride is suggested to detect intoxication at an early stage. (Six references.)

Ralph W. Danielson.

12. VISUAL TRACTS AND CENTERS

Avalos, E. **Retrospective diagnosis of a case of ocular hysteria.** Rev. Cubana de Oto-Neuro-Oft., 1933, v. 2, Sept.-Oct., p. 239.

A girl of sixteen years had sudden blindness of the right eye after loss of accommodation of one month duration. After five weeks observation and treatment, with a variety of diagnoses, among them that of late sympathetic ophthalmia, vision and accommodation suddenly returned after three days treatment with liver. Reference is made to the Gonzalez case in a previous number (see American Journal of Ophthalmology, 1933, volume 16, p. 1123) and the conclusion is arrived at that, in the absence of other cause, sudden blindness, paralysis, spasm or contracture should make one think of hysteria.

M. Davidson.

Cohen, L. H., Hilgaard, E. R., and Wendt, G. R. **Sensitivity to light in a case of hysterical blindness studied by reinforcement-inhibition and conditioning methods.** Yale Jour. Biol. and Med., 1933, v. 6, Oct., p. 61.

Using reinforcement and inhibition of eyelid reflexes, aided by conditioned eyelid reactions and conditioned verbal reactions, visual stimuli were elicited in the blind area of a hysterical patient. These results contrast with those previously reported for a case of organic hemianopsia, in which visual stimuli in the blind field elicited no response. The case history of a patient on whom data were worked out is given. (Bibliography.) Ralph W. Danielson.

NEWS ITEMS

News items should reach the Editor by the twelfth of the month.

Deaths

Dr. William Crissy Kellogg, of Augusta, Ga., died February 14 of pneumonia, at the age of fifty-nine years.

Dr. John Sabert Mott, of Kansas City, Mo.; aged eighty-nine years; died January 7 of acute dilatation of the heart.

Dr. Josiah Wellington Crane of Trenton, N.J.; aged fifty-six years; died February 18 of gastro-intestinal fistula and bronchopneumonia.

Dr. Monroe David Reese, of Lebanon, Penn.; aged thirty-seven years; died March 22, of carcinoma.

Dr. Snow Parker Freeman Cook of Gloucester, Mass.; aged seventy-one; died April 6, of ulcerative colitis and cerebral hemorrhage.

Dr. Armin Nettle, of New York; aged fifty-seven years; died February 19, of arteriosclerosis and coronary thrombosis.

Miscellaneous

The Leslie Dana Gold Medal, awarded annually for outstanding achievements in the prevention of blindness and the conservation of vision, was presented to Dr. F. de Lapersonne, noted French ophthalmologist and president of the International Association for Prevention of Blindness, at the annual meeting of the Association on May 14.

Dr. de Lapersonne is the second European to be awarded this highly prized recognition; the late Ernest Fuchs of Vienna received it in 1929. A selection for the honor is made each year by the American National Society for the Prevention of Blindness in co-operation with the St. Louis Society for the Blind, through which the medal is offered by Mr. Leslie Dana of St. Louis.

The United States was represented at today's meeting by Lewis H. Carris of New York City, Managing director of the American National Society for the Prevention of Blindness, and Dr. Park Lewis of Buffalo, N.Y., vice-president of both the American Society and the International Association. Dr. Park Lewis, who had received the Leslie Dana Medal himself in 1928, made the presentation to Dr. de Lapersonne. He also brought the warm greetings of the American Ophthalmological Society and the American Academy of Ophthalmology and Otolaryngology to their French colleagues.

"The scientific achievements of your surgeons," said Dr. Lewis, "are recognized throughout the world; none stand higher in eminence. Our two republics have much in common and we welcome an opportunity which brings us into closer relations and understanding. May I ask you to accept this disc of gold, Professor de Lapersonne, not because of its intrinsic value, but as a symbol of the deep affection in which your country is held by ours, a friendship which we trust may be endless, and for the deep regard which we hold for you, yourself."

The conditions of the Leslie Dana Medal award set forth that it is to be made for "long meritorious service for the conservation of vision in the prevention and cure of diseases dangerous to eyesight; research and instruction in ophthalmology and allied subjects; social service for the control of eye diseases; and special discoveries in the domain of general science or medicine of exceptional importance in conservation of vision."

The American Association of Hospital Social Workers and The National Society for the Prevention of Blindness presented a program on "Social service in eyesight conservation" on May 24, 1934, in Kansas City, Missouri. Dr. William M. James of Saint Louis, spoke on "The role of medical social service in preventing blindness," Miss Dorothy Hosford, of Pittsburgh, on "Possibilities for sight conservation in community work" and Miss Eleanor Lee Hearon, of Denver, on "Possibilities of sight conservation in hospital work."

The twelfth annual meeting of the Colorado Congress of Ophthalmology with its attendant graduate course in ophthalmology and otolaryngology will be given in Denver from July 23 to August 4 inclusive. The first week will be devoted entirely to ophthalmology and the second, entirely to otolaryngology. The guest speakers will be Drs. Sanford R. Gifford, Chicago; Frank E. Burch, Minneapolis; Edward Cecil Sewall, San Francisco; Isidore Friesner, New York City; and Gordon B. New, Rochester, Minn. The fee for the course is fifty dollars and application for registration should be made to Dr. H. L. Whitaker, 1234 Republic Bldg., Denver.

Societies

At the April 9 meeting of the Tennessee Academy of Ophthalmology and Otolaryngology held at Chattanooga the following officers were elected for 1934-35: President, Dr. Eugene Orr, Nashville; Vice-President, Dr. G. W. Burchfield, Maryville; Secretary-Treasurer, Dr. W. D. Stinson, Memphis.

Personals

At the May meeting of the New York Academy of Medicine Dr. Arthur J. Bedell of Albany delivered the Hermann Michael Biggs Memorial Lecture on "Causes and Prevention of Blindness."

A recent banquet, honoring Dr. Williams Evans Bruner, given by his friends and associates, officially marked the completion of his forty years of service as Ophthalmologist for the University Hospitals of Cleveland and Western Reserve University Medical School. Among the speakers were: Dr. George E. de Schweinitz of Philadelphia, former teacher of Dr. Bruner: Dr. Walter Parker of Detroit, a classmate of Dr. Bruner: Dr. Charles F. Thwing, president emeritus of Western Reserve University; Dr. Torald Sollmann, dean of the School of Medicine, Western Reserve University and Dr. Fred C. Waite.